PANTHER ECOLOGY LTD

Panther Environmental Solutions Ltd
Units 3 & 4, Innovation Centre
S.E.T.U Carlow Campus,
Green Road, Carlow
Rep. of Ireland
R93 W248

Telephone /Fax: 059-9134222
Email: info@pantherwms.com
Website: www.pantherwms.com

NATURA IMPACT STATEMENT

TULLEKA TRADING ULC.,
GRAIGUE, BALLINAKILL,
CO. LAOIS

2024

DATE:	29th May 2024	**AUTHOR:**	Paula Farrell, BSc. & Luis Miguel Soares, BSc.
REPORT NO:	PE_NIS_10049	**REVIEWED:**	Martin O'Looney, BSc.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This Appropriate Assessment - Natura Impact Statement (NIS) document has been prepared on behalf of and for the exclusive use of Tulleka Trading ULC. by Panther Environmental Solutions Ltd., with respect to an application for planning permission to Laois County Council for the extension to an existing pig farm and all ancillary site works and services at Graigue, Ballinakill, Co. Laois.

This report identified the presence of European sites within the potential zone of influence of the proposed development River Barrow and River Nore SAC (Site Code: 002162), the Lisbigney Bog SAC (Site Code: 000869) and the River Nore SPA (Site Code: 004233). The potential for likely significant effects to European sites as a result of the proposed development such as potential surface water quality impacts, introduction of invasive species, habitat destruction and impacts from noise and dust were considered and the level of risk posed assessed.

During Stage 1 Screening for Appropriate Assessment, it was considered that there may be potential for impacts upon the qualifying interests of the River Barrow and River Nore SAC and the River Nore SPA due to a potential deterioration air quality during the operational phases. Therefore, a Natura Impact Statement was prepared.

Due to the recommended control measures and standard practice during the construction and operational phases, it is considered that there would be no significant risks to the conservation objectives of the habitats and species for which the aforementioned designated sites have been designated.

It is considered that there would be no significant risk of negative impact, either alone or in combination with other plans or projects, to the integrity of the Natura 2000 network.

1.0 INTRODUCTION

This Natura Impact Statement (NIS) has been prepared by Panther Environmental Solutions Ltd., to accompany an application for planning permission to Laois County Council for the proposed extension project on the Moate Pig Unit at Graigue, Ballinakill, County Laois.

The principal aim of this study is to assess the Likely Significant Effects (LSE) to European sites (the Natura 2000 network) as a result of this project in accordance with Article 6(3) of the Habitats Directive and the Planning and Development (Amendment) Act, 2001, as amended. This report has been prepared with regards to the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), and the later amendment regulations (S.I. No. 233 of 1998; S.I. No. 237 of 2005, S.I. No. 477 of 2011).

A study was undertaken by Ms Paula Farrell of Panther Ecology Ltd who has a BSc in Wildlife Biology from Munster Technological University (formerly IT Tralee). This comprised a review of the proposed development, a site visit on the 3rd November 2023 to examine the ecological context of the proposed development, a desk study of the information on European sites within the potential zone of influence of the site and an analysis of the information in the context of the guidance to determine if a Natura Impact Statement is required.

The Appropriate Assessment and Natura Impact Statement shall be undertaken in accordance with the guidance outlined in "*Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*" (DoEHLG, Dec 2010) and "*Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites*" (EC, Nov 2001) (Revised 2021) and "*Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive*" (EC, 2019).

This report has been prepared with regard to;

- DoEHLG (2010) "*Appropriate Assessment of Plans & Projects in Ireland*"
- Environment DG, European Commission (2021) "*Assessment of plans and projects significantly affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*", Part 1 and 2.
- Department of the Environment Heritage and Local Government (DoEHLG) Circular Letter SEA 1/08 and NPWS 1/08.
- Department of the Environment Heritage and Local Government (DoEHLG) Circular letter NPWS 1/10 and PSSP 2/10
- OPR Practice Note PN01 (2021) "*Appropriate Assessment Screening for Development Management*"

2.0 LEGISLATIVE CONTEXT

The EU Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora, as amended by council directive 97/62/EC, 2006/105/EC, and Regulation EC1882/2003 of September 2003, as transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/11), provides the framework for legal protection for habitats and species of European importance.

Article 6(3) and 6(4) of the Habitats Directive lays down the procedure to be followed when planning new developments that might affect a Natura 2000 site. Article 6(3) of the Habitats Directive states;

"*Any plan or project not directly connected with, or necessary to the management of the site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site, and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.*"

Article 6(4) would come into force following a determination that a plan or project may adversely affect the integrity of a Natura 2000 site.

In Ireland, the implementation of these provisions of the EU Habitats Directive occurs in four stages:

Stage 1: Screening for Appropriate Assessment
This stage involves an initial screening assessment of the potential impacts of the project, either alone or in combination with other projects, upon a Natura 2000 site. If it can be concluded that there would be no significant impacts upon Natura 2000 sites, the assessment stops at this stage. If not, or if further assessment is required, the assessment proceeds to Stage 2.

Stage 2: Appropriate Assessment / Natura Impact Statement (NIS)
This stage assesses the impact of the project, alone or in combination with other projects or plans, on the integrity of the Natura 2000 site, with respect to the site's conservation objectives, the site's ecological structure and function and its overall integrity. The output of this stage is an NIS, which also includes any mitigation measures required to avoid, reduce or offset negative impacts of the project. If this stage determines that adverse effects on the Natura 2000 site cannot be excluded, then the plan or project should proceed to Stage 3 or be abandoned.

Stage 3: Assessment of Alternative Solutions
A detailed investigation is undertaken in this stage to determine whether alternative ways of achieving the objectives of the project or plan exist. Where no alternatives exist, the project or plan must proceed to Stage 4 or must be abandoned.

Stage 4: Assessment where no Alternatives Exist and where Adverse Impacts Remain
This is the final stage of the process, and is an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

These safeguards are intended to ensure that future plans or projects are not authorised if they are likely to adversely affect the integrity of a Natura 2000 site. Significant impacts may include, but are not exclusive to, a loss of habitat area, fragmentation of the habitat, disturbance to species using the site and changes in water resources or quality.

3.0 METHODOLOGY

Stage 1 - Screening

Screening is the first stage in the Appropriate Assessment process, and is carried out to determine whether a Stage 2 Appropriate Assessment and a Natura Impact Statement (NIS) is required. Screening addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3);

1. Whether a plan or project is directly connected to or necessary for the management of the European (Natura 2000) site; and

2. Whether a plan or project, alone or in combination with other plans or projects, is likely to have significant effects on a European (Natura 2000) site, in view of its conservation objectives.

Screening should be undertaken without the inclusion of mitigation measures. If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 AA and an NIS.

The findings and conclusions of the screening process should be documented, with the necessary supporting evidence and objective criteria. This is of particular importance in the cases where the Appropriate Assessment process ends at the screening stage because the conclusion is that no significant effects are likely.

Stage 2 – Natura Impact Assessment

The scope of this assessment follows the appropriate assessment statement methodology as defined within the European Commission guidance document "*Assessment of plans and projects significantly affecting Natura 2000 sites"* (2001), Section 3, Part 2. Guidance from the Department of the Environment, Heritage and Local Government "*Appropriate Assessment of Plans and Projects in Ireland*" (2010) and "*Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive*" (2018) have also been used in the preparation of this report. In accordance with this guidance, the following methodology has been used to produce this Natura Impact Statement:

Step 1**:** Information Required
Identifying the conservation objectives of the Natura 2000 site and the aspects of the project, alone or in combination with other projects or plans, which have the potential to affect those conservation objectives.

This process involves gathering information for the Natura 2000 site, including the conservation objectives of the site, factors contributing to conservation value, aspects sensitive to change and the existing baseline condition of the site. The principal source of information used for Natura 2000 sites, their qualifying interests and conservation objectives is the National Parks and Wildlife Service (NPWS). Information is also required for the project including the size and scale of the project, the relationship (distance, connectivity etc.) of the project to the Natura 2000 site and the characteristics of existing, proposed or other projects which have the potential to affect the Natura 2000 site.

Step 2: Impact Prediction
This process predicts and identifies the likely impacts of the project on the Natura 2000 site. Potential impacts are identified as; direct and indirect; short or long-term duration; construction, operational or decommissioning; and isolated, interactive and cumulative effects.

Step 3: Conservation Objectives
Once the potential impacts of the project have been predicted and identified, it will be necessary to assess whether these impacts will adversely impact upon the integrity of the Natura 2000 site, as defined by the site's conservation objectives and status of the site. Where it cannot be demonstrated that there will be no adverse impacts upon the Natura 2000 site, mitigation measures must be proposed for the project.

Step 4: Mitigation Measures
Upon the identification of potential impacts, the project will have on the Natura 2000 site (alone or in combination with other projects or plans), mitigation measures will be proposed to eliminate, reduce or offset these negative impacts. Mitigation measures should be considered with preference to the hierarchy of preferred options outlined in the guidance document "*Assessment of plans and projects significantly affecting Natura 2000 sites"*.

3.1 METHODOLOGY BACKGROUND

This Appropriate Assessment has been carried with reference to the following guidelines:

- *Appropriate Assessment of Plans and Projects in Ireland. Guidelines for Planning Authorities*. DoEHLG, 2010.
- Circular NPWS 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities
- *Managing Natura 2000 sites – The Provisions of Article 6 of The Habitats Directive 92/43/EEC.* European Commission, 2000.
- Circular L8/08 Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments 2 September 2008
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites. Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission, 2021.
- Commission Notice "Managing Natura 200 sites The provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission, 21.11.2018
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- OPR Practice Note PN01 (2021) "*Appropriate Assessment Screening for Development Management*".

3.2 DESKTOP RESEARCH

Desktop research was carried out to gather information on the ecology of the site and surrounding areas. The locations of the Natura 2000 sites within the potential zone of influence (ZoI) of Tulleka Trading ULC, Graigue, Co. Laois were identified from National Parks and Wildlife Service (NPWS) online map viewer. Other Natura sites were also reviewed and considered for the potential for the project to have a negative effect.

- Water quality data from the EPA was reviewed for the assessment of biological and environmental data collected on waterbodies in Ireland (Water Quality in Ireland 2013-2018 (2019)

- Information on the characteristics of the Natura 2000 sites within the potential zone of influence was reviewed from the conservation objectives documents, site synopses and Standard Natura 2000 data forms available on the NPWS website.

3.3 SITE SURVEY

A site characterisation assessment was undertaken on the 3rd of November 2023 to examine the ecological context of the development site, by systematically walking the site, adjacent land and boundaries and determining the habitats present. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.*, 2011).

Bird species and signs of fauna activity and dwellings were also noted. Particular attention was given to the possible presence of habitats and/or species, which are legally protected under Irish and European legislation and to assessing any potential ecological connectivity with Natura 2000 sites or supplementary or stepping stone habitats of relevance to Natura 2000 sites.

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT AND EXISTING SITE

4.1 PROPOSED DEVELOPMENT

The proposed development is for the extension to an existing farm located at Ballinakill, in the townland of Graigue, Co. Laois (Grid Reference E248372 N183209) Figure 4.1 below.

The applicant, Tulleka Trading ULC., operates an existing pig facility at the Moate Pig Unit site, located approximately 3.1km north-east of Ballinakill town centre and 4.9km south-east of Abbeyleix town centre. The facility is located in a rural and agricultural area, with intermittent residential development predominantly aligned along the existing road network.

The current planning application relates to the extension to an existing pig farm together with all ancillary site works and services. The proposed extension of the farm would allow for an increase in the live weight of pigs at sale, improvements to animal welfare and production efficiency to sustain the financial viability of this pig rearing enterprise. The design of the proposed houses and the revision in the management of the existing houses would allow for the implementation of best available technique (BAT) shallow pit slurry storage and reductions in emissions to atmosphere from the farm.

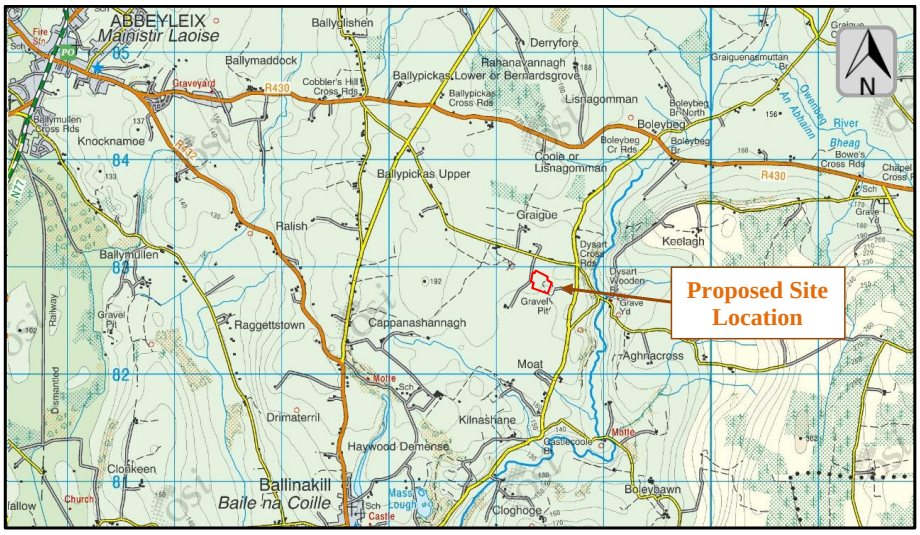

Figure 4.1: Location of Proposed Development at Graigue, Co. Laois.

The area of the current farm hub measures approximately 1.69 hectares, within a total area of 3.2 hectares of agricultural lands owned by the applicant, and includes a site office and canteen, sow house, farrowing houses, gilt houses, weaner house, stores and yard areas.

An Industrial Emissions (IE) Licence (P0710-03) was issued by the Environmental Protection Agency (EPA) in December 2011 to the Moate Pig Unit for 650 sows, 120 gilts, 4,300

weaners and 4,800 production pigs. It is not proposed to increase stocking numbers at the site.

The development would add an additional c. 1.1 ha to the farm hub, resulting in a total farm hub area of 2.7 ha. The proposed development would include the extension to the existing pig farm with five new sheds together with all ancillary site works and services. Four of the proposed houses would be used as fattening units and would have the dimensions 67.20m length and 15.27m width. The fifth new shed would be used as farrowing unit and would have the dimensions 76.68m length and 39.84m width. These would be added to the existing thirteen sheds currently in operation at the site.

Three new meal bins will be installed within the site north-west of proposed fattening house 14. These will be approximately 4.0m wide, 4.0m long and 11.2m high.

The proposed development would occur on the Moate Pig Unit property alone. The only modifications to existing structures at the site would be the change of pit storage tanks from deep pit to shallow pit at eleven (11) of the thirteen (13) existing housing units at the site.

Table 4.2: Proposed Structures / Extensions and Associated Footprints.

Proposed Structure / Extension	**Approx. Floor Area (m^2)**
Farrowing House (1 no.)	3,149
Fattening House (4 no.)	3,139 (total)

With regards to the existing stormwater drainage network, rainwater run-off from roofs and clean yards would be directed to stone soakaways (SA1 & SA2) within the red line boundary and to surface monitoring point SW1, a percolation area to the north-west. Surface water run-off from the roofs and hardcore areas for the new proposed development will be directed to an existing soakaway in the centre (SA2). All discharged surface water will be clean. Therefore, the risk of the proposed development impacting upon water quality would be greatly reduced.

Under Schedule C.2.3. of the sites EPA IE licence (P0710-03), these surface water monitoring sites are visually inspected weekly and sampled quarterly for COD.

Water for the farm is supplied from the local group water scheme and supplemented from an onsite borehole.

The site currently produces pig slurry as an animal by-product. The storage and use of animal slurry and manure as a fertiliser is controlled under European Union (Good Agricultural Practice for Protection of Waters) Regulations (S.I. 113 of 2022) (commonly referred to as the Nitrates Regulations).

Slurry generated at the existing structures onsite is directed to slurry reception locations onsite, comprising of underground slurry storage tanks. Slurry produced by animals in the proposed structures would be collected and stored within slurry tanks beneath the structures. For the Farrowing House and the Fattening Houses, additional storage would be provided by the proposed slurry reception tanks.

All soiled water produced on site (i.e. rainwater on dirty yards and water which has been used to clean down pig pens between batches) is diverted to the nearest slurry tank where it is

treated as slurry. Pig pens would be washed down at least once a week. There would be no discharge of any soiled water or any effluent from the site to any watercourse or to groundwater.

The existing and proposed slurry tanks conform to a recognised design standard for slurry storage, i.e. The Irish Department of Agriculture and Food Specifications S141 (*Minimum Specification for New Pig Houses*) April 2022.

Given that it is not proposed to increase the number of pigs at the farm, the storage capacity of current and proposed facilities would not be negatively affected by the proposed development and would be in compliance with Article 10 of the European Union (Good Agricultural Practice for Protection of Waters) Regulations (S.I. No. 605 of 2017).

Slurry from the site is currently, and would continue to be, distributed periodically to customers (i.e. local farmers) for the purpose of land spreading. The spreading of by-product pig slurry on land to supply fertiliser nutrients is provided for and is controlled under the European Union (Good Agricultural Practice for Protection of Waters) Regulations (S.I. 113 of 2022 and Directive 91/676/EEC), a.k.a. the Nitrates Regulations.

There is a septic tank present, servicing the staff toilet/facilities on site. The septic tank is in place for the disposal of domestic sewage from the site. All wastewater generated by W.C. staff facilities/office building is discharged to the septic tank system. The septic tank is constructed of pre-cast concrete and has a capacity of 4,500 litres. There will be no changes to the foul water drainage network.

The applicant intends to avail of a new modern design for low atmospheric emissions in the new farrowing and fattening structures. The proposed pig houses and 11 of the existing 13 houses would be constructed / converted to shallow pit storage, rather than deep pit storage.

The estimated timeframe for the construction of the proposed development is 6 months. Construction works would be confined to the proposed development footprint. During the construction phase, site clearance works would be undertaken, which would involve the removal of a small area of scrub habitat from the proposed development footprint and earth-moving activities. Approximately 20m of an existing hedge that is located between the existing and new proposed development will be removed to facilitate the new development. The accompanying EIAR (Document Ref: PES_EIAR_21691) recommend supplementary planting of native trees.

During excavation works, subsoil and topsoil would be segregated and temporarily stored onsite. Excavated soils would be re-used in landscaping and reinstatement works. The proposed development will not require the importation of materials likely to contain third schedule invasive materials. Exported materials will go to a licensed waste facility. Water will be supplied via an existing well onsite and local water scheme.

The current heating system is electricity. There will be no heating required for the proposed finishers. The proposed farrowing will use an electrical heating system.

The closest Natura 2000 site is the River Barrow and River Nore SAC (Site Code: 002162) located approximately 276m to the south-east and the River Nore SPA (Site Code: 004233) located approximately 5.33km to the south-west of the proposed development.

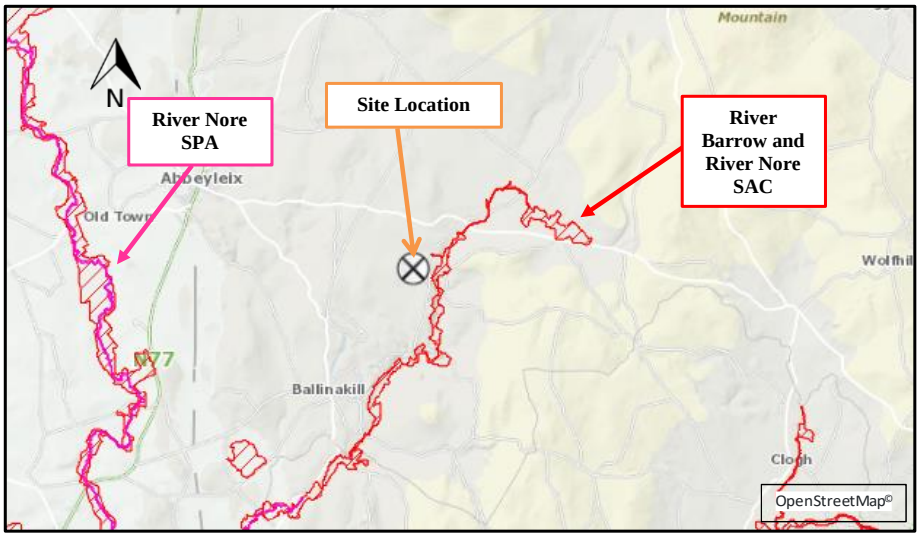

Figure 4.2: Location of Proposed Activity and Protected Habitats

The following project elements of the proposed activity have been examined for relevance to possible effects on the Natura 2000 sites;

- Disturbance to Protected Species
- Sediment & Hydrocarbon Runnoff
- Stormwater & Waste Water
- Impact on Protected Habitats
- Dust and Noise
- Invasive Species

4.2 EXISTING ENVIRONMENT

The development site is located within a rural area, in an area primarily dominated by pasture, arable land and forests. The nearest watercourse to the development site is the is the River Owveg, located approximately 394m south-east. A number of one-off residences and farmyard complexes exist in the area.

The development site is located within the Killeshin Siltstone Formation, comprising of Namurian Shales, and may be described as muddy siltstone and silty mudstone, which is generally thought to have low bulk permeability. However, the subsoil where the development site is located is highly permeable.

Based on topography and position of surface water features, shallow groundwater flow beneath the site would be expected to flow east toward the Owveg River, while deeper, regional groundwater flow would be expected to flow south to a more downstream section of the Owveg River.

A site characterisation assessment was undertaken on the 3rd of November 2024 to examine the ecological context of the development site, by systematically walking the site and boundaries and determining the habitats present. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", a hierarchical classification scheme based upon the characteristics of vegetation

present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.*, 2011).

Bird species and signs of fauna activity and dwellings were also noted. Particular attention was given to the possible presence of habitats and/or species, which are legally protected under Irish and European legislation.

During the site walkover on the 3rd November 2023, seven main habitats were identified. They are as follows;

The dominant habitat onsite was identified as **buildings and artificial surfaces (BL3)** habitat, comprising of the site office and canteen, farm sheds, walls and hard standing cement surfaces. It was species poor but includes Moss (Bryophyta), Groundsel (*Senecio vulgaris*), Red Deadnettle (*Lamium purpureum*), Willowherb (*Epilobium* spp.) and Greater Plantain (*Plantago major*).

Improved agricultural grassland (GA1) is found to the east and north and extends outside the red line boundary. This is the dominant grassland type with a species composition of Ryegrass (*Loilum* spp.), Dock (*Rumex* spp.), Creeping Buttercup (*Ranunculus repens*), Clover (*Trifolium* spp.), Thistle (*Cirsium* spp.) and Nettle (*Urtica dioica*).

Hedgerows (WL1) border the proposed development to the south and north-east. It includes Hawthorn, Holly, Blackthorn, Dog Rose, Elder, Beech, Sycamore, Gorse with an understory of Bramble (*Rubus fruticosus*), Nettle (*Urtica dioica*), Cow Parsley (*Anthriscus sylvestris*), Ivy (*Hedera helix*), Hart's-tongue Fern (*Asplenium scolopendrium*), Cleavers (*Galium aparine*) and Thistle (*Cirsium* spp.).

A **Treeline (WL2)** habitat is found along the south, and outside the west and east boundary. It is dominated by Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus* spp.) with Ash (*Fraxinus* spp.) and an understory of Cypress (*Cupressus* spp.), Elder (*Sambucus* spp.), Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*), Bramble (*Rubus fruticosus*) and Cow Parsley (*Anthriscus sylvestris*).

An area of **Scattered trees and parkland (WD5)** habitat is found to the south-west of the proposed development. It was comprised of Apple (*Malus* spp.), Beech (*Fagus* spp.), Elder (*Sambucus* spp.) with an understory of Ivy (*Hedera helix*), Creeping Buttercup (*Ranunculus repens)* and Dandelion (*Taraxacum* spp.).

An area of **recolonising bare ground (ED3)** habitat is found to the north-east amongst the chicken houses and in the centre adjacent the improved agricultural grassland. It is comprised of Nettle (*Urtica dioica*), Cleavers (*Galium aparine*), Thistle (*Cirsium* spp.), Moss (Bryophyta), Ivy (*Hedera helix*), Sycamore (Acer spp.) saplings, Dock (*Rumex* spp.), Herb Robert (*Geranium robertianum*), Red Deadnettle (*Lamium purpureum*), Groundsel (*Senecio vulgaris)*, Willowherb (*Epilobium* spp.) and Hairy Bittercress (*Cardamine hirsuta*).

Dry meadows and grassy verges (GS2) is found to the north-west. It is comprised of Bent Grass (*Agrostis* spp.), False-oat Grass (*Arrhenatherum elatius*), Mustard (Brassica), Sycamore (*Acer* spp.) and Willow (*Willow* spp.) samplings, Vetch (*Vicia* spp.), Dock (*Rumex*

spp.), Great Willowherb (*Epilobium hirsuta*), Nettle (*Urtica dioica*) and Hogweed (*Heracleum* spp.).

Habitats of note outside the red line boundary include **Improved agricultural grassland (GA1), Treeline (WL2)** and **amenity grassland (GA2)** with areas of **dry meadows and grassy verges (GS2)** to the south.

No plant species of conservation significance or third schedule invasive plant species were noted during the site assessment.

The identified habitats at the proposed development site, as per the Fossitt habitat classification scheme, are summarised in **Table 4.3** below.

Table 4.3: Summary of Habitats Identified at the Proposed Development Site

HABITAT CLASSIFICATION HIERARCHY		
LEVEL 1	**LEVEL 2**	**LEVEL 3**
G – Grassland and marsh	**GA** – Improved grassland	**GA1** – Improved agricultural grassland
		GA2 – Amenity grassland (improved)
	GS – Semi-natural grassland	**GS2** – Dry meadows and grassy verges
W – Woodland and scrub	**WL** – Linear woodland / scrub	**WL1** – Hedgerows
		WL2 – Treelines
E – Exposed rock and disturbed ground	**ED** – Disturbed ground	**ED3** – Recolonising bare ground
B – Cultivated and built land	**BL** – Built land	**BL3** – Buildings and artificial surfaces

Figure 4.3: Habitat Map

Given the agricultural land use of the surrounding area, it would be expected that common grassland and hedgerow species would be present in the area. Bird species noted during the site walkover included Blackbird (*Turdus merula*), Chaffinch (*Fringilla coelebs*), Magpie (*Pica pica*), Robin (*Erithacus rubecula*), Rook (*Corvus frugilegus*), Starling (*Sturnus vulagaris*), Coal Tit (*Periparus ater)*, House Sparrow (*Passer domesticus*), Jackdaw (*Coloeus monedula*), Bullfinch (*Pyrrhula pyrrhula*), Grey Wagtail (*Motacilla cinerea*), Goldfinch (*Carduelis carduelis*) and Wren (*Troglodytes troglodytes*). Grey Wagtail are red listed under the BoCCI classification, while House Sparrow are amber listed. None of the bird species recorded are listed under Annex I of the E.U. Birds Directive.

Mammals, typical of that found throughout the rest of Ireland, which would be expected to be found in the general area include Badger (*Meles meles*), Fox (*Vulpes vulpes*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), American Mink (*Mustela vison*), Irish Hare (*Lepus timidus hibernicus*), Rabbit (*Oryctolagus cuniculus*), Hedgehog (*Erinus europaeus*), Red Squirrel (*Sciurus vulgaris*), Wood Mouse (*Apodemus sylvaticus*), Pygmy Shrew (*Sorex minutus*), Greater White-toothed Shrew (*Crocidura russula*), Bank Vole (*Myodes glareolus*), and Fallow Deer (*Dama dama*).

Evidence of fauna (trackways) was observed within a hedgerow habitat to the south-east. No scat or footprints were observed. No evidence of any other fauna including protected species, were observed during the site walkover. In the absence of aquatic habitats within the development site itself, the site would have limited potential to support aquatic species. There was no evidence of otter, including spraints, tracks or holts, at the development site.

In addition to the site walkover, flora and fauna records for the most recent 30 years were reviewed on the National Biodiversity Data Centre (NBDC) website for the proposed development site and vicinity. The proposed development site is located within the S48 Hectad, therefore cognisance was taken of the records for the 10km square. No protected plant species under the Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) were recorded within the 10km square (Hectad – S48) in which the proposed development site is located in. There are no endangered or threatened flora recorded within hectad S48.

Five invasive plant species listed in the Third Schedule of the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) were recorded within the 10km square (Hectad – S48): Giant Hogweed (*Heracleum mantegazzianum*), Giant-rhubarb (*Gunnera tinctoria*), Himalayan Knotweed (*Persicaria wallichii*), Japanese Knotweed (*Fallopia japonica*), and *Rhododendron ponticum*.

Protected fauna and species of note recorded within the NBDC 10km square (Hectad – S48) include the protected species: Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*), Freshwater White-clawed Crayfish (*Austropotamobius pallipes*), Common Lizard (*Zootoca vivipara*), Brown Long-eared Bat (*Plecotus auritus*), Daubenton's Bat (*Myotis daubentonii*), Badger (*Meles meles*), Pygmy Shrew (*Sorex minutus*), Red Squirrel (*Sciurus vulgaris*), Otter (*Lutra lutra*), Lesser Noctule (*Nyctalus leisleri*), Natterer's Bat (*Myotis nattereri*), Pine Marten (*Martes martes*), Pipistrelle (*Pipistrellus pipistrellus sensu lato*), Red Deer (*Cervus elaphus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), West European Hedgehog (*Erinaceus europaeus*) and Whiskered Bat (*Myotis mystacinus*). High impact invasive species listed in the Third Schedule of the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) include Brown Rat (*Rattus norvegicus*), Eastern Grey Squirrel (*Sciurus carolinensis*), Fallow Deer (*Dama dama*) and Sika Deer (*Cervus nippon*).

Bird species of note recorded for the most recent 30 years include: Barn Owl (*Tyto alba*), Barn Swallow (*Hirundo rustica*), Black-headed Gull (*Larus ridibundus*), Common Coot (*Fulica atra*), Grasshopper Warbler (*Locustella naevia*), Kestrel (*Falco tinnunculus*), Kingfisher (*Alcedo atthis*), Linnet (*Carduelis cannabina*), Pheasant (*Phasianus colchicus*), Sandpiper (*Actitis hypoleucos*), Snipe (*Gallinago gallinago*), Starling (*Sturnus vulgaris*), Swift (*Apus apus*), Wood Pigeon (*Columba palumbus*), Curlew (*Numenius arquata*), Tree Sparrow (*Passer montanus*), Woodcock (*Scolopax rusticola*), Golden Plover (*Pluvialis apricaria*), Cormorant (*Phalacrocorax carbo*), Hen Harrier (*Circus cyaneus*), Herring Gull (*Larus argentatus*), House Martin (*Delichon urbicum*), House Sparrow (*Passer domesticus*), Jack Snipe (*Lymnocryptes minimus*), Lesser Black-backed Gull (*Larus fuscus*), Mallard (*Anas platyrhynchos*), Merlin (*Falco columbarius*), Mute Swan (*Cygnus olor*), Lapwing (*Vanellus vanellus*), Northern Wheatear (*Oenanthe oenanthe*), Peregrine Falcon (*Falco peregrinus*), Sand Martin (*Riparia riparia*), Sky Lark (*Alauda arvensis*), Spotted Flycatcher (*Muscicapa striata*), Stock Pigeon (*Columba oenas*), Water Rail (*Rallus aquaticus*), Whooper Swan (*Cygnus cygnus*) and Yellowhammer (*Emberiza citrinella*).

4.2.1 Water Environment

The proposed development is located within the Nore catchment (15) and the Nore_SC_060 sub-catchment.

At its closest, the site is located approximately 394m west of the Owveg River, a tributary of the Nore River, and of the River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162). The Owveg River flows in a generally south-west direction for c. 7.91 km until it reaches the River Nore Special Protection Area (SPA) (Site Code: 004233) and for a total of c. 15.5 km until the confluence of the two rivers. The River Nore then continues for several km before it meets the River Barrow, merging the two catchments. From this confluence, the river flows mostly in a southwards direction to Waterford Harbour.

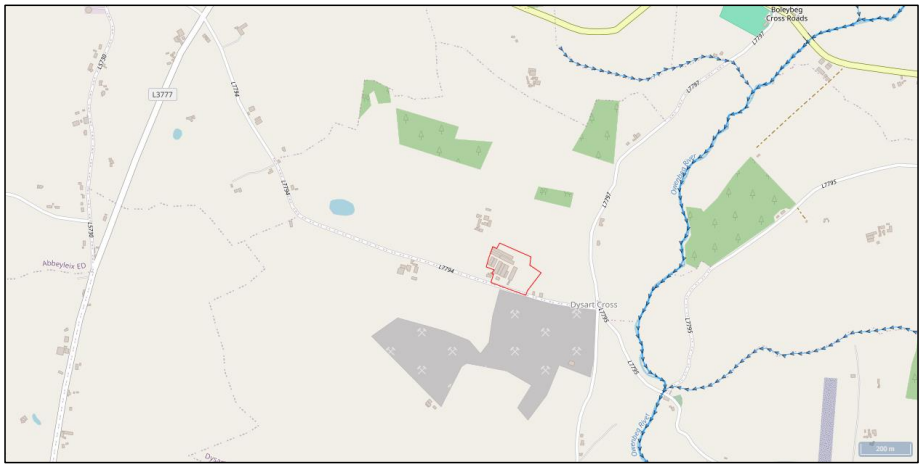

Figure 4.2: Surface Water Network (EPA Maps)

There would be no process effluent emissions from the site. The surface water collected by the current stormwater system should be uncontaminated and therefore have no impact on either the surface or groundwater in the area or on a designated site.

The Owveg River is not designated as a Salmonid Water under EC (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988).

The Environmental Protection Agency (EPA) undertake surface water monitoring along the Owveg River. The results for the nearest monitoring stations with available information (as per **Table 4.4**) for the period 2005 – 2022 are summarised in **Figure 4.2** below for indicative purposes.

Table 4.4: Monitoring Stations of the Owveg River within the Vicinity of the Development

STATION NO.	STATION LOCATION	EASTING	NORTHING	APPROX. LOCATION RELATIVE TO CLOSEST POINT TO SITE
RS15O010080	Owveg (Nore) - Boleybeg Br	249572	184084	1.4km Upstream
RS15O010160	Br WNW of Boleybawn (Cloghoge)	247986.84	181021.26	3.8km Downstream
RS15O010280	Owveg (Nore) -	245767.84	178086.81	8.4km Downstream

STATION NO.	STATION LOCATION	EASTING	NORTHING	APPROX. LOCATION RELATIVE TO CLOSEST POINT TO SITE
	Castlemarket Br			

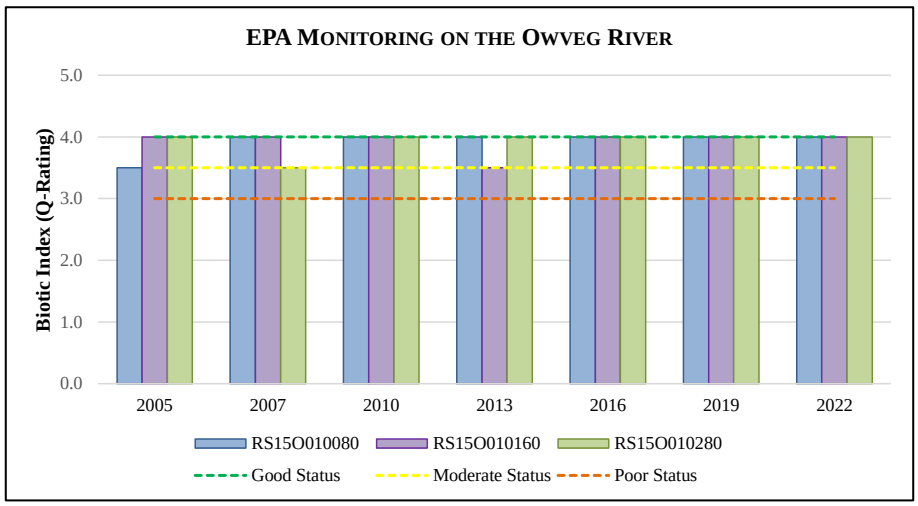

Figure 4.3: EPA Ecological Monitoring of the Owveg River from 2005 – 2022

As can be seen in Figure 4.2 above, the Owveg at the three monitoring stations has achieved a water quality status ranging between Q3-4 (moderate) to Q4 (good) from 2005 – 2022, with recent monitoring showing a water quality status of Q4 (good).

EPA comments on the most recent monitoring results for the Owveg River are as follows:

"*The Owveg (Nore) is again in Good ecological condition throughout when surveyed in 2022.*"

As per the applicant's EPA Licence, "*There shall be no emissions to water of environmental significance*". The monitoring results mentioned above indicate that the existing farm activities are unlikely to be having an adverse impact upon water quality of the Owveg River. There would be no discharges of soiled water from the site. All soiled water would be diverted to the nearest pig slurry tank. The surface water collected by the current stormwater system should be uncontaminated and therefore have no impact on either the surface or groundwater in the area.

According to the Preliminary Flood Risk Assessment (PFRA) Mapping prepared by the OPW, the development site is not located within an area of groundwater flood, pluvial flood or fluvial flood, indicative of 1% AEP (100-yr) event or 0.1% AEP (1000-yr) event. However, it should be noted that this map is based on broad-scale simple analysis and may not be accurate for a specific location.

5.0 EUROPEAN SITES (NATURA 2000 SITES)

In assessing the zone of influence of this project upon European sites, the following factors must be considered:

- Potential impacts arising from the project;
- The location and nature of European sites;
- Pathways between the development and European sites.

The project impact sources, environmental pathways and protected site characteristics were screened to identify European sites potentially within the zone of influence of the project.

One Special Protection Area (SPA) site and three Special Area of Conservation (SAC) sites occur within the potential zone of influence of the proposed development.

SITE NAME	DESIGNATION	SITE CODE	DISTANCE
River Barrow and River Nore	SAC	002162	276m S-E
Lisbigney Bog	SAC	000869	4.96km S-W
River Nore	SPA	004233	5.33km S-W
Ballyprior Grassland	SAC	002256	13.1km N-E

Maps detailing European sites within the potential zone of influence of the proposed site are included as Appendix A below.

The proposed development site is located on the Kilkenny-Ballynakill Gravels groundwater body and within the Killeshin Siltstone Formation, where a section of some of the nearest designated sites are also located, namely the River Barrow and River Nore SAC. Given the excavation works as part of the proposed development, there is potential for an impact on a protected site via groundwater. There is also a potential for an impact to occur to a protected site due to a deterioration in air quality via the deposition of atmospheric Ammonia. For this assessment, the sites considered to be within the potential zone of influence of the proposed development were the River Barrow and River Nore SAC (Site Code: 002162), the Lisbigney Bog SAC (Site Code: 000869) and the River Nore SPA (Site Code: 004233), due to hydrological connectivity with the proposed development.

Ballyprior Grassland SAC (Site Code: 002256) is not located within the same river catchment as the development site and therefore is not hydrologically connected with the development. Therefore, in the absence of a source-pathway-receptor relationship and given the distances from the development, this site has been screened out.

5.1 RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)

This site consists of most of the freshwater stretches of the Barrow/Nore River catchments. The Barrow is tidal as far upriver as Graiguenamanagh while the Nore is tidal as far upriver as Inishtioge. The site also includes the extreme lower reaches of the River Suir and all of the estuarine component of Waterford Harbour extending to Creadan Head. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and

King's Rivers on the Nore. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive:

ANNEX I HABITATS	
CODE	**DESCRIPTION**
1130	Estuaries
1140	Tidal Mudflats and Sandflats
1170	Reefs
1310	*Salicornia* Mud
1330	Atlantic Salt Meadows (*Glauco-Puccinellietalia maritimae*)
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
3260	Floating River Vegetation
4030	Dry Heath
6430	Hydrophilous Tall Herb Communities
7220	Petrifying Springs*
91A0	Old Oak Woodlands
91E0	Alluvial Forests*

** denotes a priority habitat*

ANNEX II SPECIES		
CODE	**COMMON NAME**	**SCIENTIFIC NAME**
1016	Desmoulin's Whorl Snail	*Vertigo moulinsiana*
1029	Freshwater Pearl Mussel	*Margaritifera margaritifera*
1092	White-clawed Crayfish	*Austropotamobius pallipes*
1095	Sea Lamprey	*Petromyzon marinus*
1096	Brook Lamprey	*Lampetra planeri*
1099	River Lamprey	*Lampetra fluviatilis*
1103	Twaite Shad	*Alosa fallax*
1106	Atlantic Salmon	*Salmo salar*
1355	Otter	*Lutra lutra*
1421	Killarney Fern	*Trichomanes speciosum*
1990	Nore Freshwater Pearl Mussel	*Margaritifera durrovensis*

An excerpt from the site synopsis for River Barrow and River Nore SAC is included below.

"This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow, and the Delour, Dinin, Erkina, Owveg, Munster, Arrigle and King's Rivers on the Nore. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The upper reaches of the Barrow runs through limestone, with the middle reaches and many of the eastern tributaries running through Leinster Granite. The southern end runs over intrusive rocks poor in silica. Good examples of alluvial forest are seen at Rathsnagadan, Murphy's of the River and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Rusty Willow (*S. cinerea* subsp. *oleifolia*), Crack Willow (*S. fragilis*) and Osier (*S. viminalis*), along with Iris (*Iris*

pseudacorus), Hemlock Water-dropwort (*Oenanthe crocata*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*).

Good examples of old oak woodlands include those at Cloghristic Wood, Drummond Wood and Borris Demesne. Borris Demesne contains a very good example of a semi-natural broadleaved woodland in very good condition, with a high degree of natural regeneration of oak and ash. Drummond Wood consists of three blocks of deciduous woods situated on steep slopes. The deciduous trees are mostly oak species. The woods have a well-established understorey of Holly, and the herb layer is varied. Eutrophic tall herb vegetation occurs within various areas of alluvial forest and where the river floodplain is intact. Characteristic species include Meadowsweet, Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*) and Hedge Bindweed (*Calystegia sepium*). The invasive Indian Balsam (*Impatiens glandulifera*) is abundant in places. Floating river vegetation is well represented in the Barrow and many of its tributaries. Species include water-starworts (*Callitriche* spp.), Bulbous Rush (*Juncus bulbosus*), water-milfoils (*Myriophyllum* spp.), pondweeds (*Potamogeton* spp.) and crowfoots (*Ranunculus* spp.).

Dry heath occurs in pockets along the steep valley sides of the rivers. Dry heath vegetation consists of Bracken and Gorse (*Ulex europaeus*) with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Creeping Bent (*Agrostis stolonifera*). Dry heath generally grades into wet woodland or wet swamp vegetation lower down the slopes on the riverbank. In the foothills associated with the Aughnabrisky, Aughavaud and Mountain Rivers there are wet heath areas dominated by Purple Moor-grass (*Molinia caerulea*) with Heather (*Calluna vulgaris*) and Bell Heather (*Erica cinerea*). Salt meadows occur at the site's southern section. In the larger salt meadow areas, the Atlantic and Mediterranean sub types are generally intermixed. At the salt meadow's upper edge, the legally protected Borrer's Saltmarsh-grass (*Puccinellia fasciculata*), Meadow Barley (*Hordeum secalinum*) and Divided Sedge (*Carex divisa*) are found. Other flora present includes Sea Rush (*Juncus maritimus*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Glassworts (*Salicornia* spp.) and other annuals colonising mud / sand are found in the saltmarsh creeks and at seaward edges.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species, including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bar-tailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh, the Curragh, Goul Marsh and along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country.

Land use at the site consists mainly of agricultural activities. The spreading of slurry and fertiliser poses a threat to the water quality and to the populations of Annex II species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries, with both commercial and leisure fishing taking place. Other recreational activities such as boating, golfing and walking are also popular. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, over-grazing within woodland areas and invasion by non-native species. The water quality of the site remains vulnerable. Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein."

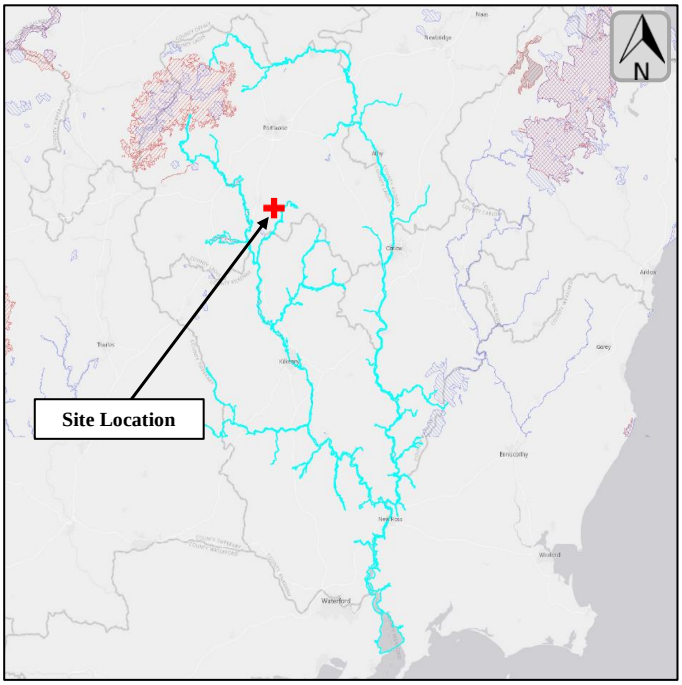

Figure 5.1: River Barrow and River Nore SAC

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive. Furthermore, it is of high conservation value for the populations of bird species that use it.

River Barrow and River Nore SAC Conservation Objectives

The conservation objectives for the SAC site are to maintain or restore the favourable conservation condition of the qualifying interests. Site specific conservation objectives (SSCOs) for the qualifying interests of the River Barrow and River Nore SAC are provided in the table below, where available from the NPWS document "Conservation Objectives: River Barrow and River Nore SAC 002162" (NPWS, 2011).

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
[1130] Estuaries			
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes	Habitat area was estimated using OSI data and the defined Transitional Water Body area under the Water Framework Directive as 3856ha
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex; Fine sand with *Fabulina fabula* community.	
Community extent	Hectares	Maintain the natural extent of the *Sabellaria alveolata* reef, subject to natural process	
[1140] Tidal Mudflats and Sandflats			
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.	Habitat area was estimated using OSI data as 926ha
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex	
[1170] Reefs			
None Specified	-	-	
[1310] Salicornia Mud			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession.	The Ringville sub-site was mapped and no additional areas of potential Salicornia mudflat were identified from an examination of aerial photographs, giving a total estimated area of 0.03ha. Note further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline, subject to natural processes	
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions	
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession	
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated.	
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project	
Vegetation structure: negative indicator species: *Spartina anglica*	Hectares	No significant expansion of Spartina. No new sites for this species and an annual spread of less than 1% where it is already known to occur	
[1330] Atlantic Salt Meadows			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Four sub-sites were mapped and additional areas of potential saltmarsh were identified from an examination of aerial photographs, giving a total estimated area of Atlantic salt meadow of 35.07ha. Note further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline, subject to natural processes	
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession.	
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
Vegetation structure: vegetation cover	Percentage cover at a representative sample	Maintain more than 90% of area outside creeks vegetated	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
	of monitoring stops		
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project	
Vegetation structure: negative indicator species: *Spartina anglica*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur	
[1410] Mediterranean Salt Meadows			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Dunbrody Abbey - 0.08ha, Rochestown - 0.04ha, Ringville - 6.70ha	Three sub-sites were mapped and no additional areas of potential saltmarsh were identified from an examination of aerial photographs, giving a total estimated area of Mediterranean salt meadow of 6.82ha. Note further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline, subject to natural processes	
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions	
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession	
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	
Vegetation structure: vegetation cover	% cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated.	
Vegetation composition: typical species and sub-communities	% cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in Saltmarsh Monitoring Project	
Vegetation structure: negative indicator species: *Spartina*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
anglica		1% where it is already known to occur	
[3260] Floating River Vegetation			
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation assemblage associated with tidal reaches of large rivers between Enniscorthy and Polladerg townland. Due to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. A natural (relatively unmodified) flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	
Hydrological regime: groundwater discharge	Metres per second	The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation	
Substratum composition: particle size range	Millimetres	The substratum should be dominated by large particles and free from fine sediments	
Water chemistry: minerals	Milligrammes per litre	The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits	
Water quality: suspended sediment	Milligrammes per litre	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments	
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	
[4030] Dry Heath			
Habitat distribution	Occurrence	No decline from current habitat distribution, subject to natural processes	Spatial extent currently unmapped but indicated as occurring on the steep, free-draining, river valley sides especially the Barrow and tributaries in the foothills of the Blackstairs Mountains. Dry heath in this SAC occurs on free-draining nutrient poor soils and is often
Habitat area	Hectares	Area stable or increasing, subject to natural processes. Habitat area is not known but estimated as less than 400ha of the area of the SAC, occurring in dispersed locations	
Physical structure: free-draining, acid, low nutrient soil;	Occurrence	No significant change in soil nutrient status, subject to natural processes. No increase or	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
rock outcrops		decrease in area of natural rock outcrop	characterised by gorse and open acid grassland areas. And locally bilberry and woodrush. Bracken appears to be quite dense in places and before any management action is considered its rate of spread needs to be established as well as its threat, if any, to other dry heath species and its potential value to important fauna (e.g. Twite). Broomrape is dependent on gorse at this site as it is parasitic on gorse roots. It is recorded as occurring on steep slopes above New Ross. A small area of excellent dry coastal heath at Ballyhack is interspersed with patches rock and of dry lowland grassland and has a high species diversity. Notably there is an excellent range of Clover (*Trifolium*) species including the legally protected clustered clover, a species known only from one other site in Ireland. Also *T. ornithopodiodes, T. striatum* and *Torilus nodosa.*
Vegetation structure: sub- shrub indicator species	Percentage cover	Cover of characteristic sub- shrub indicator species at least 25%: gorse (*Ulex europaeus*) and where rocky outcrops occur bilberry (*Vaccinium myrtillus*) and woodrush (*Luzula sylvatica*). Some rock outcrops support English stonecrop (*Sedum anglicum*), sheep's bit (*Jasione montana*) and wild madder (*Rubia peregrina*) as well as important moss and lichen assemblages	
Vegetation structure: senescent gorse	Percentage cover	Cover of senescent gorse less than 50%	
Vegetation structure: browsing	Percentage cover	Long shoots of bilberry with signs of browsing collectively less than 33%	
Vegetation structure: native trees and shrubs	Percentage cover	Cover of scattered native trees and shrub less than 20%	
Vegetation composition: positive indicator species	Number	Number of positive indicator species at least 2 e.g. gorse and associated dry heath/ acid grassland flora	
Vegetation structure: positive indicator species	Percentage cover	Cover of positive indicator species at least 60%. This should include plant species characteristic of dry heath in this SAC including gorse, bilberry and associated acid grassland flora	
Vegetation composition: bryophyte and non-crustose lichen species	Number	Number of bryophyte or non- crustose lichen species present at least 2	
Vegetation composition: bracken (*Pteridium aquilinum*)	Percentage cover	Cover of bracken less than 10%	
Vegetation structure: weedy negative indicator species	Percentage cover	Cover of agricultural weed species (negative indicator species) less than 1%	
Vegetation composition: non-native species	Percentage cover	Cover of non-native species less than 1%.	
Vegetation composition: rare/scarce heath species	Location, area and number	No decline in distribution or population sizes of rare, threatened or scarce species, including Greater Broomrape (*Orobanche rapum-genistae*)	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
		and the legally protected clustered clover (*Trifolium glomeratum*)	
Vegetation structure: disturbed bare ground	Percentage cover	Cover of disturbed bare ground less than 10% (but if peat soil less than 5%)	
Vegetation structure: burning	Occurrence	No signs of burning within sensitive areas	
[6430] Hydrophilous Tall Herb Communities			
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution of this habitat in this site is currently unknown. Considered to occur in association with some riverside woodlands, unmanaged river islands and in narrow bands along the floodplain of slow-flowing stretches of river. This habitat requires winter inundation, which results in deposition of naturally nutrient-rich sediment. Bare ground, due to natural indundation processes may often be present. Attribute and target based on the Irish Semi-natural Grassland Survey (O'Neill et al., 2010)
Habitat area	Hectares	Area stable or increasing, subject to natural processes	
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regimes	
Vegetation structure: sward height	Centimetres	30-70% of sward is between 40 and 150cm in height	
Vegetation composition: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	
Vegetation composition: typical species	Number	At least 5 positive indicator species present	
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam (*Impatiens glandulifera*), monkeyflower (*Mimulus guttatus*), Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*)	
[7220] Petrifying Springs			
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Full distribution of this habitat in this site is currently unknown. It has been described in woodlands at Dysart, between Thomastown and Inistioge. Current hydrological regimes are unknown. Petrifying springs rely on permanent irrigation, usually from
Habitat distribution	Occurrence	No decline	
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions	
Vegetation composition: typical	Occurrence	Maintain typical species	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
species			upwelling groundwater sources or seepage sources. Water chemistry is currently unknown. Water supply to petrifying springs is characteristically oligotrophic and calcareous The bryophytes *Cratoneuron commutatum* and *Eucladium verticillatum* are diagnostic of this habitat.
[91A0] Old Oak Woodlands			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 85.08ha for sub-sites surveyed	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions. Oak regenerates poorly. In suitable sites ash can regenerate in large numbers although few seedlings reach pole size. Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources. Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem. The following are the most common invasive species in this woodland type:
Habitat distribution	Occurrence	No decline.	
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi- mature trees and shrubs; and well-developed herb layer	
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	
Woodland structure: veteran trees	Number per hectare	No decline	
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Beech (*Fagus sylvatica*), Rhododendron (*Rhododendron ponticum*), Cherry laurel (*Prunus laurocerasus*)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	
[91E0] Alluvial Forests			
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions. Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size. Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem. Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources. The following are the most common invasive species in this woodland type: Sycamore (*Acer pseudoplatanus*), Beech (*Fagus sylvatica*), Rhododendron
Habitat distribution	Occurrence	No decline.	
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi- mature trees and shrubs; and well-developed herb layer	
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	
Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	
Woodland structure: veteran trees	Number per hectare	No decline	
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	(*Rhododendron ponticum*), Cherry laurel (*Prunus laurocerasus*), Dogwood (*Cornus sericea*), Himalayan honeysuckle (*Leycesteria formosa*) and Himalayan balsam (*Impatiens grandiflora*).
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including ash (*Fraxinus excelsior*) alder (*Alnus glutinosa*), willows (*Salix* spp) and locally, oak (*Quercus robur*)	
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	
[1016] Desmoulin's Whorl Snail			
Distribution: occupied sites	Number	No decline. Two known sites: Borris Bridge, Co. Carlow S711503; Boston Bridge, Kilnaseer S338774, Co. Laois.	
Population size: adults	Number per positive sample	At least 5 adults snails in at least 50% of samples	
Population density	Percentage positive samples	Adult snails present in at least 60% of samples per site	
Area of occupancy	Hectares	Minimum of 1ha of suitable habitat per site	
Habitat quality: vegetation	Percentage of samples with suitable vegetation	90% of samples in habitat classes I and II	
Habitat quality: soil moisture levels	Percentage of samples with appropriate soil moisture levels	90% of samples in moisture class 3-4	
[1029] Freshwater Pearl Mussel			
The status of the FPM as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review			
[1092] White-clawed Crayfish			
Distribution	Occurrence	No reduction from baseline	The crayfish is present almost throughout this SAC. The records extend as far

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Population structure: recruitment	% occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples	downstream as Thomastown on the Nore and Graiguenamanagh on the Barrow. Alien crayfish species are identified as major direct threat to this species and as disease vector. Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weeds and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available on the whole length of occupied habitat
Negative indicator species	Occurrence	No alien crayfish species	
Disease	Occurrence	No instances of disease	
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality	
[1095] Sea Lamprey			
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Juveniles burrow in areas of fine sediment in still water. Lampreys spawn in clean gravels.
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	
Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	
[1096] Brook Lamprey			
Distribution	% of river accessible	Access to all water courses down to first order	Artificial barriers can block lampreys'

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
		streams	upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. It is impossible to distinguish between brook and river lamprey juveniles in the field. Juveniles burrow in areas of fine sediment in still water. Lampreys spawn in clean gravels.
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	
[1099] River Lamprey			
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. It is impossible to distinguish between brook and river lamprey juveniles in the field. Juveniles burrow in areas of fine sediment in still water. Lampreys spawn in clean gravels.
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	
[1103] Twaite Shad			
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	In some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas.
Population structure- age classes	Number of age classes	More than one age class present	
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning habitats	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Water quality- oxygen levels	Milligrammes per litre	No lower than 5mg/l	Regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore.
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	
[1106] Atlantic Salmon			
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*). Salmon spawn in clean gravels. Q values based on triennial water quality surveys carried out by the EPA.
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	
Out-migrating smolt abundance	Number	No significant decline	
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	
[1355] Otter			
Distribution	% positive survey sites	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance. Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater and wrasse and rockling in coastal waters Otters will utilise freshwater habitats from estuary to headwaters within
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds	
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 857.7ha	
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 616.6km	
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 2.6ha	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Couching sites and holts	Number	No significant decline	80m of the shoreline.
Fish biomass available	Kilograms	No significant decline	
[1421] Killarney Fern			
Distribution	Location	No decline. Three locations known, with three colonies of gametophyte and one sporophyte colony	'Juvenile' sporophytes, which appear as small entire fronds, are known from this site. However, it is unknown whether they are due to apogamous growth or sexual reproduction.
Population size	Number	Maintain at least three colonies of gametophyte, and at least one sporophyte colony of over 35 fronds	
Population structure: juvenile fronds	Occurrence	At least one of the locations to have a population structure comprising sporophyte, unfurling fronds, 'juvenile' sporophyte and gametophyte generations	
Habitat extent	m²	No loss of suitable habitat, such as shaded rock crevices, caves or gullies in or near to, known colonies. No loss of woodland canopy at or near to known locations	
Hydrological conditions: visible water	Occurrence	Maintain hydrological conditions at the locations so that all colonies are in dripping or damp seeping habitats, and water is visible at all locations	
Hydrological conditions: humidity	Number of dessicated fronds	No increase. Presence of dessicated sporophyte fronds or gametophyte mats indicates conditions are unsuitable	
Light levels: shading	Percentage	No changes due to anthropogenic impacts	
Invasive species	Occurrence	Absent or under control	
[1990] Nore Freshwater Pearl Mussel			
Distribution	Kilometres	Maintain at 15.5km.	The population stretches from Poorman's Bridge (S407859) to Lismaine Bridge (S442660), with most of the population found between Poorman's Bridge and the Avonmore Creamery above Ballyragget (S 440 722). The extant wild population of Nore
Population size: adult mussels	Number	Restore to 5,000 adult mussels	
Population structure: recruitment	Percentage per size class	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	

TABLE 5.1.3 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
Habitat extent	Kilometres	Restore suitable habitat in length of river corresponding to distribution target (15.5km) and any additional stretches necessary for salmonid spawning	freshwater pearl mussel is estimated as 300 adult individuals. Mussels of no more than 65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels of no more than 30mm are 'juvenile mussels' and are always buried in the substratum. This species is known not to have reproduced successfully in the River Nore since 1970. Juvenile mussels require full oxygenation while buried in gravel. Salmonid fish are host to the larval form of freshwater pearl mussels and thus, they are essential to the completion of the life cycle. As native brown trout appear to be favoured by the Nore freshwater pearl mussel, it is particularly important that these are not outcompeted by stocked fish.
Water quality: Macroinvertebrate s and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality- macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality- filamentous algae: absent or trace (<5%)	
Substratum quality: sediment	Occurrence	Restore substratum quality- stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment.	
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	

River Barrow and River Nore SAC Conservation Status

According to the Habitat's Directive, favourable conservation status of a habitat is achieved when:

- Its natural range and areas it covers within that range are stable or increasing, and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable as defined below.

According to the Habitat's Directive, favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Table 5.1.4: The conservation statuses for the qualifying interests of the River Barrow and River Nore SAC site are outlined below.

CODE	QUALIFYING INTEREST	NATIONAL CONSERVATION STATUS*
1130	Estuaries	Inadequate
1140	Tidal Mudflats and Sandflats	Inadequate
1170	Reefs	Inadequate
1310	*Salicornia* Mud	Favourable
1330	Atlantic Salt Meadows	Inadequate
1410	Mediterranean Salt Meadows	Inadequate
3260	Floating River Vegetation	Inadequate
4030	Dry Heath	Bad
6430	Hydrophilous Tall Herb Communities	Bad
7220	Petrifying Springs	Inadequate
91A0	Old Oak Woodlands	Bad
91E0	Alluvial Forests	Bad
1016	Desmoulin's Whorl Snail	Inadequate
1029	Freshwater Pearl Mussel	Bad
1092	White-clawed Crayfish	Bad
1095	Sea Lamprey	Bad
1096	Brook Lamprey	Favourable
1099	River Lamprey	Unknown
1103	Twaite Shad	Bad
1106	Atlantic Salmon	Inadequate
1355	Otter	Favourable
1421	Killarney Fern	Favourable
1990	Nore Freshwater Pearl Mussel	Bad

**Sourced from the Status of EU Protected Habitats and Species in Ireland (NPWS, 2019b and 2019c).*

5.2 Lisbigney Bog SAC (SITE CODE: 000869)

Lisbigney Bog is situated about 5 km north-east of Durrow in Co. Laois. Although referred to as a bog, this site is actually a wetland dominated by fen vegetation. It is a former lake basin, and is now criss-crossed by streams. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (SAC) selected for the following habitats listed on Annex I of the E.U. Habitats Directive:

ANNEX I HABITATS	
CODE	**DESCRIPTION**
7210	*Cladium* Fens*
1016	Desmoulin's Whorl Snail (*Vertigo moulinsiana*)

** denotes a priority habitat*

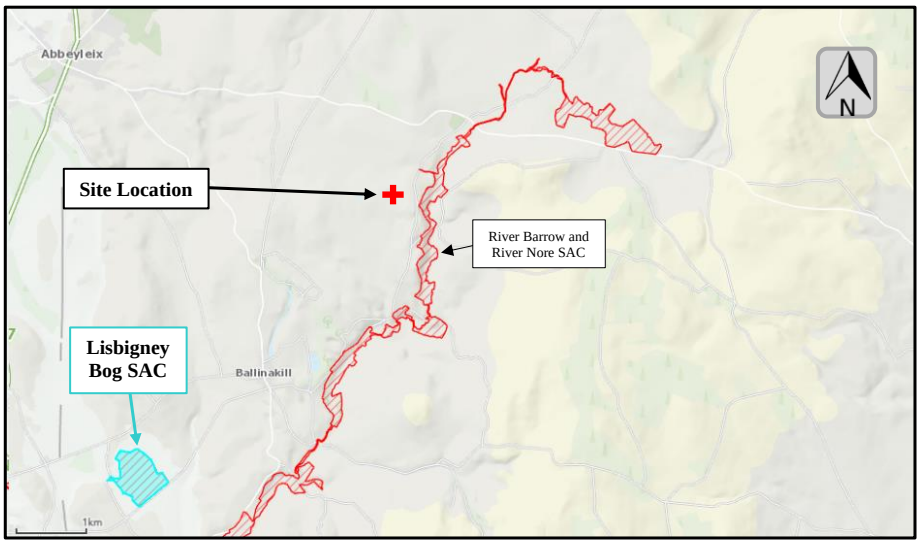

Figure 5.2: Lisbigney Bog SAC

An excerpt from the site synopsis for Lisbigney Bog SAC is included below.

"At Lisbigney Bog areas of sedge-dominated communities with Meadowsweet (*Filipendula ulmaria*), Lesser Spearwort (*Ranunculus flammula*) and Bog-myrtle (*Myrica gale*) divide dense stands of Common Reed (*Phragmites australis*) in the south-west from areas of Great Fen-sedge (*Cladium mariscus*) towards the north-east. In the centre of the stand of reeds is a small area of standing water with an abundance of Marsh Cinquefoil (*Potentilla palustris*), accompanied by a variety of bryophyte species, including *Marchantia polymorpha*, *Calliergon giganteum* and *Bryum pseudotriquetrum*. Scrub and areas of grassland dominated by Purple Moor-grass (*Molinia caerulea*) surround the fen.

The rare snail *Vertigo moulinsiana* was recorded at the site in 1998. This species is a glacial relict with a disjunct European population. It is considered to be vulnerable due to loss of

habitat, particularly drainage of wetlands. In Ireland, the species is sparsely distributed in the central lowlands, where it mostly occurs in calcareous wetlands/fens.

Birds recorded at the site includes Jay, Blackcap and Snipe.

Lisbigney Bog is of considerable conservation significance for the good example of *Cladium* fen, a priority-listed habitat on Annex I of the E.U. Habitats Directive, and for the population of *Vertigo moulinsiana* that it supports."

Lisbigney Bog SAC Conservation Objectives

The conservation objectives for the SAC site are to restore the favourable conservation condition of the qualifying interests. Site specific conservation objectives (SSCOs) for the qualifying interests of the Lisbigney Bog SAC are provided in the table below, where available from the NPWS document "Conservation Objectives: Lisbigney Bog SAC 000869" (NPWS, 2021).

TABLE 5.1.4 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae**			
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Habitat area was estimated as 9.91ha. The habitat occurs in association with other fen, marsh and common reed (*Phragmites australis*) swamp vegetation in the SAC.
Habitat distribution	Occurrence	No decline, subject to natural processes	
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain/restore soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined.
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients; water supply	Restore appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Regional abstraction of groundwater may affect fen groundwater levels. In this SAC, the water table level has been noted as significantly below the requirements for *Cladium* fen.
Ecosystem function: hydrology - surface water flow	Drain density and form	Restore as close as possible to natural or semi-natural, drainage conditions	A network of drainage ditches cross the SAC and drainage is a significant issue for the habitat.
Ecosystem function: water quality	Various	Maintain/restore appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Water drains into the habitat in the SAC from the surrounding intensively managed farmland; hence any fertilisers, herbicides or pesticides used on the farms may be washed into the SAC.
Vegetation composition: cover of *Cladium mariscus*	Percentage cover at a representative number monitoring	Cover of *Cladium mariscus* at least 25%	Typical vascular plant species that have been recorded in the habitat in the SAC include great fen-sedge (*Cladium mariscus*), black

TABLE 5.1.4 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
	stops		bog-rush (*Schoenus nigricans*), purple moor-grass (*Molinia caerulea*), purple loosestrife (*Lythrum salicaria*), common valerian (*Valeriana officinalis*), marsh cinquefoil (*Comarum palustre*), marsh marigold (*Caltha palustris*), wild angelica (*Angelica sylvestris*), meadow thistle (*Cirsium dissectum*), meadowsweet (*Filipendula ulmaria*) and water horsetail (*Equisetum fluviatile*). Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include *Anthoxanthum odoratum*, *Epilobium hirsutum*, *Holcus lanatus*, *Juncus effusus*, *Phragmites australis*, *Ranunculus repens* and *Typha latifolia*. Non-native species can be invasive and have deleterious effects on native vegetation. In the fen habitat in this SAC, scrub encroachment by birch (*Betula* sp.), gorse (*Ulex europaeus*) and willow (*Salix* sp.) scrub has been reported, as well as the occurrence of several mature Scots pine trees (*Pinus sylvestris*). Algal cover is indicative of nutrient enrichment from multiple sources
Vegetation composition: typical vascular plants	Percentage cover at a representative number of monitoring stops	Maintain/restore adequate cover of typical vascular plant species	
Vegetation composition: native negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of native negative indicator species at insignificant levels	
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	
Vegetation structure: vegetation height	Percentage cover at a representative number of monitoring stops	At least 10% of live shoots more than 1m high	
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity	Cover of disturbed bare ground not more than 10%	Burning has been noted as a threat to the fen vegetation in this SAC.

TABLE 5.1.4 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
	of, a representative number of monitoring stops		
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes.	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists.
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain/restore adequate transitional areas to support/protect the *Cladium* fen habitat and the services it provides	It is important that the transitional areas between *Cladium* fen and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen. Habitat that is structurally suitable for Desmoulin's whorl snail (*Vertigo moulinsiana*) should be maintained/restored
[1016] Desmoulin's Whorl Snail *Vertigo moulinsiana*			
Distribution	Number of occupied 1km squares	Population restored to baseline. There is one recorded site for the species in the SAC within the 1km grid square S4479.	Desmoulin's whorl snail (Vertigo moulinsiana) was last recorded in Lisbigney Bog SAC in 1998 at one site within the 1km grid square S4479; it was not found in 2006, 2010 or 2016. Further work is required to definitively establish the status of the species in this SAC.
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	Restore to self-sustaining population	A self-sustaining population will be indicated by detection of both adults and juveniles.
Habitat area	Hectares	Restore area of suitable habitat, subject to natural processes	In 1998, Desmoulin's whorl snail (*Vertigo moulinsiana*) was recorded at Lisbigney Bog SAC in swamp and fen vegetation with

TABLE 5.1.4 RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES			
ATTRIBUTE	**MEASURE**	**TARGET**	**SELECTED NOTES**
			greater tussock-sedge (*Carex paniculata*), lesser pond-sedge (*C. acutiformis*) and meadowsweet (*Filipendula ulmaria*). It was classified as a mixture of tall herb swamps (FS2) and wet grassland (GS4) of Fossitt (2000). Since then, the habitat has become unsuitable for the species and restoration is required.
Habitat quality: water levels	Hydrological regime	Restore suitable hydrological regime, subject to natural processes	Water levels appear to have dropped at this SAC, making conditions unsuitable for Desmoulin's whorl snail (*Vertigo moulinsiana*).

Lisbigney Bog SAC Conservation Status

Table 5.1.5: The conservation statuses for the qualifying interests of the Lisbigney Bog SAC site are outlined below.

CODE	QUALIFYING INTEREST	NATIONAL CONSERVATION STATUS*
7210	*Cladium* fens	Inadequate
1016	Desmoulin's Whorl Snail	Inadequate

5.3 RIVER NORE SPA (SITE CODE: 004233)

The site is a SPA under the E.U. Birds Directive, of special conservation interest for the species listed in the table below. The E.U. Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

TABLE 5.2.1: QUALIFYING INTERESTS		
CODE	COMMON NAME	SCIENTIFIC NAME
A229	Kingfisher	*Alcedo atthis*

An excerpt from the site's Natura 2000 Data Form is included below.

"The River Nore SPA is a long, linear site that includes the following river sections: the River Nore from the bridge at Townparks, (north-west of Borris in Ossory) to Coolnamuck (approximately 3 km south of Inistioge) in Co. Kilkenny; the Delour River from its junction with the River Nore to Derrynaseera bridge (west of Castletown) in Co. Laois; the Erkina River from its junction with the River Nore at Durrow Mills to Boston Bridge in Co. Laois; a 1.5 km stretch of the River Goul upstream of its junction with the Erkina River; the Kings River from its junction with the River Nore to a bridge at Mill Island, Co. Kilkenny. The site includes the river channel and marginal vegetation.

For a large part of its course the River Nore traverses Carboniferous limestone plains; it passes over a narrow band of Old Red Sandstone rocks below Thomastown.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher.

A survey in 2010 recorded 22 pairs of Kingfisher (based on 16 probable and 6 possible territories) within the SPA. Other species which occur within the site include Mute Swan (35), Mallard (267), Cormorant (14), Grey Heron (45), Moorhen (14), Snipe (17) and Sand Martin (1,029) – all figures are peak counts recorded during the 2010 survey.

The River Nore SPA is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive."

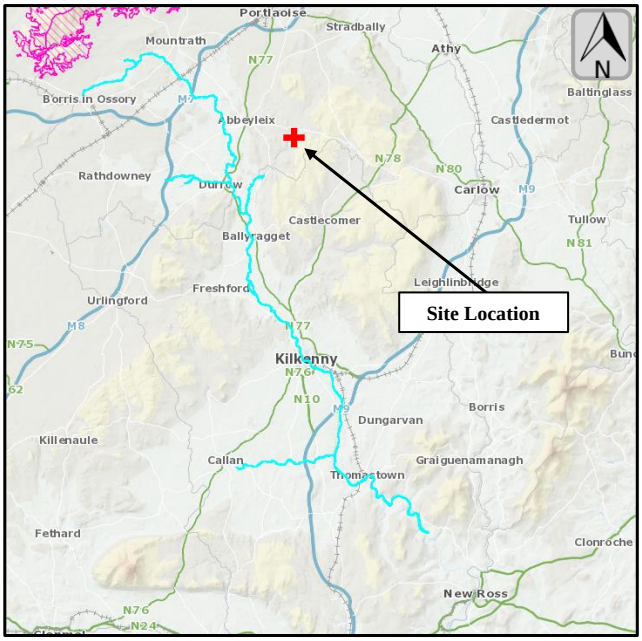

Figure 5.3: River Nore SPA

The River Nore SPA Conservation Objectives

The Habitats Directive requires the Appropriate Assessment process to assess the potential impacts of the development "in view of the site's conservation objectives". Site specific conservation objectives (SSCOs) for the qualifying interests of The River Nore SPA 004233" (NPWS, 2022) notes that the conservation objectives for the SPA site are to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The River Nore SPA Conservation Status

According to the Habitat's Directive, favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

TABLE 5.2.2: CONSERVATION STATUS: RIVER NORE SPA		
CODE	**SPECIAL CONSERVATION INTEREST**	**NATIONAL CONSERVATION STATUS***
A229	Kingfisher	Amber list

** Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et al, 2021) and Bird Atlas 2007 - 2011*

6.0 ASSESSMENT OF LIKELY EFFECTS: STAGE 1 SCREENING

6.1 DISTURBANCE TO PROTECTED HABITATS AND SPECIES

The proposed development does not directly impinge on any part of a European site, and as such would not be expected to have any *in-situ* effects upon a protected site through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density or diversity.

The closest protected site to the development is River Barrow and River Nore SAC, located approximately 276m to the south-east. Lisbigney Bog SAC and River Nore SPA are hydrologically connected to the development and are located approximately 4.96km and 5.33km respectively from the development site. Given the presence of designated sites within the vicinity of the development, potential *ex-situ* impacts must also be considered.

There is no woodland habitat within the proposed development site red line boundary. Therefore, the proposed development would not have any links to habitats of interest such as Old Oak Woodlands [91A0] or Alluvial Forests [91E0] that could potentially be impacted. The closest Old Oak Woodlands is located approximately 44km to the south (62km hydrologically downstream near Graiguenamanagh) and the closest Alluvial Forests is located approximately 9.8km to the south-west and 23km hydrologically upstream of the development site. Therefore, it is not considered that the proposed development would have any impact on these habitats.

No areas of heath or marsh / swamp habitats occur at the proposed development site; therefore, the site does not contain any habitat which would have potential links to Dry Heath [4030] or Hydrophilous Tall Herb Communities [6430]. Dry Heath is currently unmapped however it is known to occur on steep-free draining valley sides especially along the River Barrow and tributaries in the Blackstairs Mountains. Therefore, it is not considered that the proposed development would have any impact on this habitat.

Hydrophilous Tall Herb Communities distribution is currently unknown within the River Barrow and River Nore SAC. Considered to occur in association with some riverside woodlands, unmanaged river islands and in narrow bands along the floodplain of slow-flowing stretches of river. The proposed development does not contain any aquatic or freshwater habitats. Therefore, it is not anticipated that there would be any likely significant effects to this protected habitat.

The tidal stretches of the River Nore are greater than 75 km (hydrologically) downstream from the proposed site, thus qualifying interests associated with saltwater and tidal conditions would not be present adjacent to the proposed development. The Owveg [Nore] would likely contain aquatic freshwater species of conservation value. The proposed development will not require any works within a drainage ditch or watercourse.

During the site assessment, no Killarney Fern [1421] was present with the closest records located approximately 75km (hydrologically) downstream (near Inistioge). In the absence of swamp, fen and marsh habitat within the site, and in the absence of historic records, it is not considered that the proposed development would be suitable to support populations of Desmoulin's Whorl Snail. According to the Conservation Objectives report for the River

Barrow and River Nore SAC, the closest records for this species are approximately 30km (hydrologically) upstream from the proposed development.

Kingfisher is listed as a qualifying interest of the River Nore SPA. The nearest mapped watercourse is the Owveg [Nore] watercourse located approximately 394m to the east of the proposed development. There are no NBDC records for the special conservation interest for the 2km square (Tetrads – S48W) in which the development is located. As there is no watercourse within the site boundary, the proposed development would not offer suitable habitat for Kingfisher.

No areas of peatland or fens exist within the development site, therefore the site does not contain any habitat which would have potential links to Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] for which Lisbigney Bog SAC has been designated.

Construction work has the potential to disturb fauna due to the generation of construction noise. However, construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Works would typically be undertaken during daylight hours, therefore, it is not considered that the increased noise levels during the construction phase would have a significant impact upon nocturnal species. Fauna within the area would be accustomed to noise generated from the existing operating farm, vehicular traffic from the road network, agricultural activities and extractive activities in the vicinity. The proposed development would constitute significant change in the existing noise environment surrounding the farm from proposed ventilation equipment and there would be no appreciable increase in traffic to the farm.

The potential disturbance on protected habitats due to dust during the construction phase would not be considered significant, given the transient nature of construction works, the construction timeframe (6 months) and distances to designated sites. Additionally, it is proposed to adhere to good working practices and standard dust mitigation measures to ensure that the levels of dust generated would be minimal during the construction phase and are unlikely to cause any likely significant effects upon a Natura 2000 site.

It is therefore considered that the proposed development would not result in any direct significant risk to the protected habitats and species of River Barrow and River Nore SAC, Lisbigney Bog SAC or River Nore SPA due to habitat fragmentation or loss, disturbance or reduction in species density or diversity.

However, the Ammonia Impact Assessment Report notes that there are a number of ammonia and nitrogen sensitive habitats associated with the Lisbigney Bog SAC, River Nore SPA and the River Barrow River Nore SAC within 10km from the site. Therefore, the proposed development could have an impact on habitat fragmentation or loss, disturbance or reduction in species density due to the deposition of ammonia during the operational phase. Potential impacts in relation to air quality are discussed in section 6.4.

6.2 INVASIVE SPECIES

Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011, save in accordance with a licence granted under paragraph (7), any person

who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence.

Materials containing invasive species such as Japanese Knotweed are considered "controlled waste" and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011, it is a legal requirement to obtain a license to move "vector materials" listed in the Third Schedule, Part 3.

As noted in Section 4.2, six invasive flora species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 have been recorded by the NBDC within the 10km square (Tetrad – S48) in which the proposed development site is located within: Canadian Waterweed (*Elodea canadensis*), Giant Hogweed (*Heracleum mantegazzianum*), Giant-rhubarb (*Gunnera tinctoria*), Himalayan Knotweed (*Persicaria wallichii*), Japanese Knotweed (*Fallopia japonica*), and *Rhododendron ponticum*.

No third schedule invasive species were noted as present during the site walkover.

The risk of invasive species being introduced onto the site during the construction phase of the project is considered to be low, with no import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling where required, therefore no importation of topsoil or subsoil would be required as part of the development works.

Given the nature of the proposed development, there would be no significant risk of introducing invasive species during the operational phase.

Therefore, it is considered that there would be no significant risk to protected habitats and species as a result of invasive species from the proposed development.

6.3 POTENTIAL IMPACTS ON WATER QUALITY

The proposed development is located within the Nore Catchment (15). The nearest watercourse is the Owveg [Nore], located approximately 394m from the proposed development. The Owveg is hydrologically connected to the River Barrow and River Nore SAC and the River Nore SPA.

During the operational phase, stormwater comprised of rainwater run-off from roofs and clean yards from the existing farm, is directed to stone soakaways in the centre and south-west of the site (SA1 & SA2) and to a percolation area (SW1) to the north-west. Surface water from the new proposed development will discharge to an existing soakaway in the centre (SA2). The surface water collected by the current and new proposed stormwater system will be uncontaminated and therefore have no impact on either the surface or groundwater in the area or on a designated site. Therefore, there are no anticipated impacts in terms of water quality of the River Barrow and River Nore SAC during the operational phase .

As noted in Section 4.2.1, stormwater drainage from the development site is hydrologically connected to River Barrow and River Nore SAC and River Nore SPA.

Lisbigney Bog SAC, despite being located within the same subcatchment as the proposed site, does not have a direct hydrological connection via surface water and is within a separate groundwater body. Therefore, it is not anticipated that there would be any potential impacts on water quality due to the proposed development.

During the construction phase of projects, a deterioration in water quality can arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils). A deterioration in water quality has the potential to have an impact upon the qualifying interests of the River Barrow and River Nore SAC and River Nore SPA, particularly qualifying interests which have conservation objectives relating to water quality. The qualifying interest of the River Nore SPA, Kingfisher (*Alcedo atthis*) [A229], feeds on various species of small fish and larger aquatic insects. Consequently, an impact on water quality could impact food availability for Kingfisher.

The risk of water quality deterioration as a result of uncured concrete would be reduced, given that precast concrete / blockwork would be used where possible and surplus concrete would be returned to the batching plant. The proposed development will alter the soil infiltration capacity however, the infiltration capacity of the soil within the surrounding area would still be available. Excavated soils would be used in site levelling and landscaping activities and therefore would be exposed for a limited period of time only.

Construction works would be approximately six months in duration and would be confined to the proposed development footprint. No works will take place within or immediately adjacent to a watercourse or drainage ditch. In terms of groundwater, given the distance to the nearest watercourse and proposed construction works, it is not anticipated that the proposed development would have a significant impact on the River Barrow and River Nore SAC due to groundwater. According to the Ground Water Data Viewer live maps, the proposed development is located within an area of high soil permeability however, an area of low permeability exists between the proposed development and the River Barrow and River Nore SAC. Given the distance, it is unlikely that any potential contaminants during the construction phase would reach the Owveg River. As the permeability of the soil is low to the east, potential contaminants would be retained within the vicinity of the works. Given the nature of construction activities required, the short duration of construction works (6 months) and given the distance to the nearest watercourse (approximately 394m), there is considered to be no significant risk of water quality deterioration as a result of hydrocarbon spillage.

There are no process effluent emissions from the site, with all animal manure stored within underground slurry tanks, awaiting collection for land spreading activities. All slurry tanks have been designed to ensure the site has sufficient storage capacity for any manure generated onsite. Pit storage tanks would change from deep pit to shallow pit at eleven (11) of the thirteen (13) existing housing units at the site and additional storage would be provided by new tanks for the proposed farrowing and finishing houses.

The development could result in a potential impact upon the biodiversity of designated sites through the land spreading of pig manure as organic fertiliser, either through pollution of waterbodies or the enrichment of natural vegetation. However, manure is, and would

continue to be, distributed among local farmers, for application to lands held by third parties in the area. The transport and spreading of the manure is managed in compliance with the Nitrates Regulations (S.I. No. 112 of 2022), as amended, and the DoAFM Fifth Nitrates Action Programme 2022-2025. The regulations provide for controls designed to protect groundwater and surface water from impacts due to the application of fertiliser on agricultural lands. Acceptable spreading times are limited, prohibitions on weather and ground conditions are defined and set back distances from waterbodies and wells/springs and limitations for areas of extreme groundwater vulnerability are established.

The spreading of manure would be undertaken in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. This would minimise the risk of any pollution occurring, and protected sites being impacted due to the spreading of organic fertilisers. As manure from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spread lands, it is considered that the impact of manure being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of land spreading areas.

No potential impacts upon water quality would be anticipated due to accidents and potential spills and leaks, given the absence of watercourses within the vicinity of the site, the low volume of stored chemicals onsite and given that chemicals and oils are stored upon bunds, in accordance with the site's Industrial Emissions (IE) Licence.

As discussed in Section 4.2, the flood risk to the development is considered to be negligible, given that the site is not located within, or within the immediate vicinity, of an area of pluvial, fluvial or groundwater flood zone. In the unlikely event of a flood onsite, it is highly unlikely that floodwaters would come in contact with any significant potentially hazardous or polluting substances which could adversely affect water quality given the nature of the development. Therefore, the development would not be anticipated to pose a significant risk upon the SAC's or SPA site as a result of floodwaters.

Given the proposed drainage system during the operational phase, absence of works within a watercourse or drainage ditch and low risk to water quality during the construction phase, it is not considered that the proposed development would have a significant impact on water quality during the operational or construction phase.

Commented [PF1]: updated

6.4 POTENTIAL IMPACTS ON AIR QUALITY

Nitrogen (N) and Ammonia (NH3) can have significant impacts on "*biodiversity through eutrophication, acidification or direct toxic effect*" (IWM, 2022) if above the critical limits. Both Ammonia and Nitrogen can have an impact on Natura 2000 sites. Nitrogen promotes fast-growing species outcompeting some of the more sensitive species while ammonia causes "*direct foliar damage*" and can ultimately result in a loss of sensitive species. According to the Irish Wildlife Manual (2022), the impact on nitrogen deposition on peatland habitats can change the overall function of the habitats itself whereby peatlands become sources of carbon rather than carbon sinks. Critical limits are thresholds set for impacts which can occur from air pollution.

SCAIL (Simple Calculation of Atmospheric Impact Limits) provides information on the current concentrations of Ammonia, Nitrogen and Acid deposition in proximity to Natura 2000 sites. According to SCAIL, the existing concentrations of Ammonia, Nitrogen Deposition and Acid Deposition for the Natura 2000 sites within the potential zone of influence in terms of air quality are as follows.

Table 6.2: The background concentration and critical load of Ammonia, Nitrogen Deposition and Acid Deposition for Natura 2000 sites within the sone of influence.

Name	Distance (km)	Background concentration at receptor edge		Critical Load / Level			Habitat
		NH3 (µg/m3)	N Dep. (kg N/ha/yr)	N Dep. (kg N/ha/yr)	NH3 Critical Load	Acid Dep Critical Load	
River Barrow and River Nore SAC	276m	3.06	8.24	Lower:1 Upper:3	Lower:1 Upper:3	maxN:0.409 maxS:0.339 minN:0.014	No sensitive habitat or species at this site
Lisbigney Bog SAC	4.96km	2.9	7.37	Lower:1 Upper:3	Lower:1 Upper:3		No sensitive habitat or species at this site
River Nore SPA	5.33km	2.77	7.18	Lower:1 Upper:3			No sensitive habitat or species at this site

The SCAIL assessments has determined that the proposed development is above the critical load for the River Barrow and River Nore SAC, Lisbigney Bog Sac and the River Nore SPA.

The guidance document EPA (May 2021) "*Assessment of the Impact of Ammonia and Nitrogen on Natura 2000 sites from Intensive Agriculture Installations*" has been used to determine the potential impact of the proposed development.

The following table outlines the steps of the assessment process outlined within section 4 of the document:

Step 1		**Answer**
Q1	Is my site within 500m of any Natura 2000	Yes
Q2	Are the background levels already exceeded for the ammonia critical level or nitrogen critical load at Natura sites within the zone of influence of my site (as reported by SCAIL)?	Yes
Q3	Is my site within 10km of River Barrow and River Nore SAC, River Nore SPA or Lisbigney Bog SAC?	Yes
Result	**Proceed to Step 4: Detailed assessment**	
Step 4: The applicant/licensee is required to complete detailed modelling (not a screen) and a NIS. Following completion of the NIS and modelling, the results can again be assessed using the criteria below. **Thresholds:** Is the process contribution (PC) • ≤1% of the critical level for ammonia		

- ≤1% of the critical load for nitrogen deposition?

Therefore, an Ammonia Impact Assessment Report and an Odour Impact Assessment were carried out by Katestone Environmental Pty Ltd. to perform a predictive odour, ammonia and depositional nitrogen impact assessment of an existing farm and proposed extension to pig production facility utilising library emission data and dispersion-modelling software CALPUFF.

6.5 SCREENING CONCLUSION

In order for an effect to occur, there must be a pathway between the source and the receptor (the SAC and SPA sites). Where a pathway does not exist, an impact cannot occur. In the absence of a direct hydrological connection from the proposed development to the designated sites, the River Barrow and River Nore SAC, Lisbigney Bog SAC and River Nore SPA, it is not considered that the proposed development would have a significant impact due to a deterioration in water quality. However, the proposed development could have a significant impact on protected sites due to a deterioration in air quality via the release of atmospheric ammonia during the operational phase.

As detailed above, it is considered that the proposed development would not result in any significant risks to the protected habitats and species of the River Barrow and River Nore SAC, Lisbigney Bog SAC or River Nore SPA due to habitat fragmentation or loss, disturbance, reduction in species density or due to the potential introduction of invasive species.

Lisbigney Bog SAC, despite being located within the same subcatchment as the proposed site, does not have a direct hydrological connection via surface water and is within a separate groundwater body. Therefore, it is not anticipated potential impacts on water quality due to the proposed development site. However, the deposition of atmospheric nitrogen has the potential to adversely impact upon a qualifying interest of this site.

However, it has been determined that there could be a likely significant effect on a Natura 2000 site due to air pollution during the operational phase.

According to the assessment process described in the EPA's Assessment of the Impact of Ammonia and Nitrogen on Natura 2000 Sites From Intensive Agriculture Installations, any such development within 500m of any Natura 2000 site proceeds to Step 4, in which "*The applicant/licensee is required to complete detailed modelling (not a screen) and a NIS.*" Therefore, a Natura Impact Statement is required.

7.0 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS: STAGE 2 APPROPRIATE ASSESSMENT

Describe the significant effects, if any, on the relevant European site which have occurred, which are occurring or which can reasonably be expected to occur as a result of the project or plan (alone or in combination).

The proposed development has the potential to impact upon the qualifying interests of the River Barrow and River Nore SAC, Lisbigney Bog SAC or River Nore SPA due to a potential deterioration in air quality.

During the operational phase of the proposed development, there is potential for an increase in ammonia, nitrogen and acid deposition which could have a negative impact to a Natura 2000 site.

Nitrogen is naturally present within the air and required for plants to grow. However, higher concentrations of nitrogen deposition can result in changes in the vegetation composition of sensitive habitats and the loss of sensitive species due to being outcompeted by more tolerant species. Higher concentrations of nitrogen pollution, particularly ammonia (NH_3) can alter the pH of habitats through eutrophication and acidification thereby limiting the availability of suitable habitats. For example, peatlands are typically nutrient poor habitats with an acidic pH and species adapted to such conditions. The acidic pH and anaerobic conditions mean that plant material does not fully break down, thereby limiting nutrient availability. An influx in nutrients such as ammonia and nitrogen would change the species composition and the loss of peatland specific plans. Agricultural activities is the source of all ammonia emissions in Ireland.

Increased nutrient input within a freshwater system can cause eutrophication. This results in a significant growth of aquatic plants, particularly algae. As plant growth increases, oxygen depletion occurs due to increased photosynthesis and through the decomposition of plant organic material. The increase in plant growth can also limit the availability of sunlight.

The tables below outline which of the qualifying interests may be impacted upon by a potential deterioration in water quality from the proposed development. The following tables also briefly outline the occurrence of the qualifying interests of the designated sites, taking cognisance of the NPWS site synopsis and conservation objectives reports, and of Volumes 1, 2 and 3 of the 2019 NPWS Reports, "The *Status of EU Protected Habitats and Species in Ireland*".

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[1130] Estuaries	The development site is located outside the current known distribution, current range and favourable reference range of these qualifying interests (NPWS, 2019b). The nearest examples of these qualifying interests are located approximately 70km (hydrologically) downstream of the development site (NPWS, 2011). Given the considerable distance, it is not anticipated that the development would have the potential to negatively impact upon these qualifying interests.	No
[1140] Tidal Mudflats and Sandflats	The development site is located outside the current known distribution, current range and favourable reference range of these qualifying interests (NPWS, 2019b). The nearest examples of these qualifying interests are located approximately 89km (hydrologically) downstream of the development site (NPWS, 2011). Given the considerable distance, it is not anticipated that the development would have the potential to negatively impact upon these qualifying interests.	No
[1170] Reefs	The development site is located outside the current known distribution, current range and favourable reference range of these qualifying interests (NPWS, 2019b). The nearest examples of these qualifying interests are located greater than 115km (hydrologically) downstream of the development site (NPWS, 2011). Given the considerable distance, it is not anticipated that the development would have the potential to negatively impact upon these qualifying interests.	No
[1330] Atlantic Salt Meadows (*Glauco-Puccinellietalia maritimae*)	The development site is located outside the current known distribution, current range and favourable reference range of these qualifying interests (NPWS, 2019b). The nearest examples of these qualifying interests are located approximately 97km (hydrologically) downstream of the development site (NPWS, 2011). Given the considerable distance, it is not anticipated that the development would have the potential to negatively impact upon these qualifying interests.	No

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[1410] Mediterranean salt meadows (*Juncetalia maritimi*)	The development site is located outside the current known distribution, current range and favourable reference range of these qualifying interests (NPWS, 2019b). The nearest examples of these qualifying interests are located greater than 100km (hydrologically) downstream of the development site (NPWS, 2011). Given the considerable distance, it is not anticipated that the development would have the potential to negatively impact upon these qualifying interests.	No
[3260] Floating River Vegetation	The development site is located within the current distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). The full extent of this habitat in this site is currently unknown and it is possible that this habitat is present within the Owveg river. The Conservation Objectives for this qualifying interest include water quality attributes. Therefore, there is potential for the proposed development to have an impact upon this qualifying interest due to a potential deterioration in water quality.	Yes
[4030] Dry Heath	The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). The SAC Conservation Objectives report notes that the spatial extent of this habitat is currently unmapped, but is indicated as occurring on steep, free-draining river valley sides. Dry heath is a terrestrial habitat, therefore a potential deterioration in water quality during construction works would not be anticipated to have a significant adverse impact upon this qualifying interest should it be present along the Owveg River. The proposed development is located within a rural environment with agricultural lands surrounding the site and this habitat would not be expected to be present within the area.	No

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[6430] Hydrophilous Tall Herb Communities	The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). The SAC Conservation Objectives report notes that the distribution of this habitat within the SAC site is currently unknown, but is considered to occur at some riverside woodlands, river islands and in narrow bands along the floodplain of slow-flowing river stretches. This habitat was not observed within the proposed development boundary. Water quality is not listed as a conservation objective for this qualifying interest. It is therefore not anticipated that the development site would have the potential to adversely impact upon this qualifying interest.	No
[7220] Petrifying Springs*	The development site is located within the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). The nearest example of this qualifying interest is located downstream on the River Nore (NPWS, 2011) approximately 64km south of the development site. Given the considerable hydrological distance, it is not anticipated that the development site would have direct or indirect negative impacts upon this qualifying interest.	No
[91A0] Old Oak Woodlands	The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). According to the SAC Conservation Objectives report, old oak woodlands are located approximately 44km south (62km hydrologically downstream near Graiguenamanagh. However, the report notes that further unsurveyed areas may be present within the SAC. Old oak woodlands are a terrestrial habitat, therefore a deterioration in water quality during construction works would not be anticipated to have a significant adverse impact upon this qualifying interest. Given the significant distance to this habitat and lack of direct hydrological connection, it is not anticipated that the proposed development would have a significant impact due to a deterioration in water or air quality.	No
[91E0] Alluvial Forests*	The development site is located within the current distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). According to the SAC Conservation Objectives report, alluvial forests are located approximately 9.8km south-west and 23km hydrologically upstream of the development site. However, the report notes that further unsurveyed areas may be present within the SAC. A potential deterioration in water quality would not be considered to have a significant adverse impact upon this qualifying interest. However, there is potential for the proposed development to have an impact upon this qualifying interest due to changes in soil nutrients due to atmospheric nitrogen.	Yes

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*)	The Desmoulin's whorl snail is the largest of the whorl snail species occurring in wetlands in Ireland. It favours damp or wet habitats such as swamps, fens and marshes, where it lives mostly in moss, leaves and decaying vegetation (NPWS, 2019c). Desmoulin's whorl snail feeds on living and dead stems and leaves of tall plants in wetland habitats. The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019c). According to the SAC Conservation Objectives report, the nearest record of Desmoulin's whorl snail is located approximately 30km (hydrologically) upstream of the development site near Durrow. Water quality is not listed as a conservation objective for this qualifying interest, it is not anticipated that the development site would have the potential to adversely impact upon the Desmoulin's whorl snail.	No
[1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1990] Nore Freshwater Pearl Mussel (*Margaritifera durrovensis*)	Freshwater pearl mussels (both *Margaritifera margaritifera* and *M. m. durrovensis*) are long-lived, bivalve molluscs found in clean, fast-flowing rivers. *M. margaritifera* is widespread in Ireland, however, the population has been in decline for a long time, with the current decline attributed to a combination of hydrological and morphological changes, sedimentation and enrichment of its habitat (NPWS, 2019a). The Nore pearl mussel (*M. m. durrovensis*) is a hard-water form of the freshwater pearl mussel and is only found within the River Nore's main channel. Previously, the Nore pearl mussel was reported separately as taxon 1990 (*M. durrovensis*), however genetic research has since placed the Nore population within the *Margaritifera margaritifera* taxon (NPWS, 2019c). The species has an unusual life cycle. Eggs develop into the larval stage (glochidia), which are brooded in the female gills before being released into open water. A small number are inhaled by passing salmonid fish, which act as the mussels' temporary hosts. Once mature enough to exist independently, they fall off their hosts and bury into gravel where they filter feed (Moorkens, 2000). The development site is located within the current known distribution, current range and favourable reference range of the freshwater pearl mussel (NPWS, 2019c). The SAC Conservation Objectives report notes that the status of *Margaritifera margaritifera* as a qualifying interest for the site is currently under review, while *M. m. durrovensis* is confined to a 15km (approximate) stretch of the River Nore, this is located above the tidal reach of the River Nore. The proposed development is located along the stretches of the Owveg River and upstream from the River Nore. The closest	Yes

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
	NBDC record for Freshwater Pearl Mussel is within the S47 hectad along the River Nore to the south of Ballinakill. The Conservation Objectives for this qualifying interest notes Salmonid fish are host to the larval form of freshwater pearl mussels. A deterioration in water quality could impact on Salmonid fish thereby impact on Freshwater Pearl Mussel. Freshwater Pearl Mussel are sensitive to sedimentation and nutrient enrichment. Furthermore, as the larval stages rely on salmonid fish hosts, any potential impact on salmonid fish can have an impact upon the Pearl Mussel. The conservation objectives report includes water quality attributes.	
[1092] White-clawed Crayfish (*Austropotamobius pallipes*)	The White-clawed Crayfish is the only native crayfish species found in Ireland and is a relatively long-lived species with a maximum life of 10 years. It occurs in both streams and lakes in Ireland and requires relatively hard water with a pH of 7 or above and calcium concentrations of at least 5mg/l. White-clawed crayfish are omnivorous, with young crayfish more reliant than adults on animal foods. The development site is located within the current distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019c). The SAC Conservation Objectives report notes that crayfish are present almost throughout the SAC. Potentially located within the Owveg river c. 394m of the proposed site. According to the Conservation Objectives report, White-Clawed Crayfish have been recorded approximately 3.7km (hydrologically) downstream of development site. The Conservation Objectives for this qualifying interest include water quality attributes.	Yes
[1095] Sea Lamprey (*Petromyzon marinus*)	Lamprey can play an important role in processing nutrients, nutrient storage, and nutrient cycling in streams. In addition, they aid in creating spawning beds for salmonid species by altering the river channel and bed. Sea lamprey are an anadromous species, with adults living at sea and migrating to freshwater for spawning in late May or June. The fertilised eggs hatch within days, with the larvae burrowing into fine sediment where they filter feed for a number of years. Transformation to young adults occurs in summer and young adults can be found migrating downriver to estuarine waters in autumn – winter. The development site is located outside the current known distribution, current range and favourable reference range of the Sea Lamprey (NPWS, 2019c). The SAC Conservation Objectives	Yes

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
	report notes that upstream migration may be inhibited by artificial barriers, and that artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat. The River Nore was not developed for navigation in its freshwater reaches and downstream of weirs there is accumulation of gravels and larger alluvial material that provide suitable spawning grounds for adult sea lamprey (King 2006). The SAC Conservation Objectives report notes that upstream migration may be inhibited by artificial barriers, and that artificial barriers are currently preventing juvenile lampreys from accessing the full extent of suitable habitat. Lamprey sp. were noted within the Dinin Sub-Catchment and throughout the Nore catchment (Gordon et al, 2021). The Conservation Objectives for this qualifying interest include water quality attributes.	
[1096] Brook Lamprey (*Lampetra planeri*) [1099] River Lamprey (*Lampetra fluviatilis*)	The brook lamprey is the smallest of the three lampreys native to Ireland and is the only species that is non-parasitic and spends all its life in freshwater. Adults spawn in spring, excavating shallow nests in gravel areas of reduced flow. Adult fish die after spawning. After hatching, larvae drift/swim downstream to areas with a fine silt composition. They burrow into this bed material and live as filter feeders for years before transforming into young adult fish. The young adults overwinter before migrating short distances upstream to gravelled areas where they spawn. The development site is located within the current known distribution and current range of brook lamprey (NPWS, 2019c). River lamprey are an anadromous species, with adults living at sea and migrating to freshwater for spawning in March and April. The adult fish die after spawning. The fertilised eggs hatch within days, with the larvae burrowing into fine sediment where they filter feed for a number of years before transforming into adult fish. The young river lamprey then migrate downriver to estuarine waters. River and brook lamprey are indistinguishable as larvae. The mature adult forms are distinguishable on the basis of body size. Lamprey surveys have necessarily focussed on juvenile lamprey. Consequently, the vast majority of available data relates to "*Lampetra* sp." and cannot be assigned to one species or the other. The development site is located outside the current known distribution, current range and favourable reference range of River Lamprey (NPWS, 2019c). Potentially located within the Owveg river approximately 394m east of development site. Lamprey sp. were noted on Dinin Sub-Catchment and throughout the Nore Catchment (Gordon et al, 2021).	Yes

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
	The Conservation Objectives for this qualifying interest include water quality attributes.	
[1103] Twaite Shad (*Alosa fallax*)	Twaite Shad spend most of their life in estuaries and coastal waters but migrate upriver to spawn in late spring. Following spawning, adult Twaite Shad return to estuaries. Limited knowledge indicates that Irish Twaite Shad may live in estuarine waters for at least two full years prior to going to sea. The development site is located outside the current known distribution, current range and favourable reference range of the Twaite Shad (NPWS, 2019c). The nearest records for Twaite Shad are located in the River Barrow approximately 14km hydrologically upstream from the confluence with River Nore. Artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas.	No
[1106] Atlantic Salmon (*Salmo salar*)	Atlantic Salmon use rivers to reproduce and as nursery areas. Eggs are deposited during winter in river gravels. The eggs hatch into alevins in spring, which in turn develop into fry. The fry feed for the summer and autumn, gradually becoming parr. Fry and parr feed primarily upon invertebrates. The Irish population generally comprises fish that spend two winters in freshwater before going to sea in spring as smolts. Adults spend 1-3 years at sea, feeding upon crustaceans and fish as they migrate to feeding grounds in the North Atlantic. The majority of Irish fish spend one winter at sea before returning to their natal rivers, mainly during the summer, as grilse. The development site is located within the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019c). Potentially located within the Owveg River approximately 394m east of the development site. Salmon were noted on the Dinin Catchment and throughout the Nore catchment (Gordon et al, 2021). The Conservation Objectives for this qualifying interest include water quality attributes.	Yes
[1355] Otter (*Lutra lutra*)	Otters have two basic requirements: aquatic prey and safe refuges where they can rest. Otters are opportunistic predators with a broad and varied diet. In freshwater areas, a variety of fish will be taken, while crayfish and frogs can be important locally or seasonally. The proposed development site is located within the current distribution, current range and favourable reference range of otter (NPWS, 2019c). A significant impact on water quality could indirectly impact upon this qualifying interest by causing a reduction in prey populations and	Yes

RIVER BARROW AND RIVER NORE SAC (SITE CODE: 002162)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
	availability. The National Otter Survey of Ireland 2010/12 (Reid *et al.*, 2013) report noted that the occurrence of otter within survey sites for the south-eastern river basin district was 70.8%. While no evidence of otter (including spraints and tracks) was recorded during the site assessment, Otter have been recorded in Ballyroan approximately 1.2km to the north-west of the development site according to NBDC records. A significant impact on water quality could indirectly impact upon this qualifying interest by causing a reduction in prey populations and availability.	
[6985] Killarney Fern (*Vandenboschis speciosa*)	The Killarney fern is a type of filmy fern, with characteristically thin, membranous, translucent fronds. This fern grows in deeply shaded, humid areas such as dripping caves, crevices and overhangs of cliffs, within stream gullies, by waterfalls and on the floor of damp woodlands (NPWS, 2019c). The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019c). According to the SAC Conservation Objectives report, the nearest record of Killarney fern to the development site is located approximately 75km (hydrologically) downstream (near Inistioge) of the development site.	No

LISBIGNEY BOG SAC (SITE CODE: 000869)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[7210] *Cladium* fens	The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019b). The nearest example of this qualifying interest is located approximately 5.2km southwest of the development site (NPWS, 2021). The Conservation Objectives for this qualifying interest include water quality attributes. However, Lisbigney Bog SAC, despite being located within the same subcatchment as the proposed site, does not have a direct hydrological connection via surface water and is within a separate groundwater body. Therefore, it is not anticipated potential impacts on water quality due to the proposed development site.	Yes

	The deposition of atmospheric ammonia and nitrogen has the potential to change the species composition of this habitat through promoting competition for vascular plants, such as tall grasses. Therefore, it is anticipated that the proposed development may have the potential to adversely impact upon this qualifying interest.	
[1016] Desmoulin's whorl snail (*Vertigo moulinsiana*)	The Desmoulin's whorl snail is the largest of the whorl snail species occurring in wetlands in Ireland. It favours damp or wet habitats such as swamps, fens and marshes, where it lives mostly in moss, leaves and decaying vegetation (NPWS, 2019c). Desmoulin's whorl snail feeds on living and dead stems and leaves of tall plants in wetland habitats. The development site is located outside the current known distribution, current range and favourable reference range of this qualifying interest (NPWS, 2019c). According to the SAC Conservation Objectives report, Desmoulin's whorl snail has been recorded in the S4479 1km grid square, less than 5km to the south-west of the site. Water quality is not listed as a conservation objective for this qualifying interest, it is not anticipated that the development site would have the potential to adversely impact upon the Desmoulin's whorl snail.	No

Additional information sourced from Birdwatch Ireland and Birdlife International.

RIVER NORE SPA (SITE CODE: 002206)		
QUALIFYING INTEREST	**OCCURRENCE / ASSESSMENT**	**POTENTIAL IMPACT**
[A229] Kingfisher (*Alcedo atthis*)	Resident species on streams, rivers and canals throughout Ireland. The diet consists of small fish including Stickleback, Chun and Minnows and larger aquatic insects. Water quality would have an impact on this species.	Yes

8.0 SUMMARY OF POTENTIAL IMPACTS

As discussed previously, the proposed development could result in an impact on the Lisbigney Bog SAC, River Barrow and River Nore SAC and the River Nore SPA due to a deterioration in water quality during the construction phase and deterioration in air quality as a result of ammonia deposition during the operational phase.

Odour and Ammonia Impact Assessment Reports were carried out by Katestone Environmental Pty Ltd (Document Ref: DK21007-7) to perform a predictive odour, ammonia and depositional nitrogen impact assessment of an existing farm and proposed extension to pig production facility utilising library emission data and dispersion-modelling software CALPUFF. This assessment was to ascertain whether the levels of emissions from the proposed pig production facility will result in ground level impact in the vicinity of the site operations and on Natura 2000 sites. See accompanying Odour Impact Assessment (Document Ref: DK21007-6) and Ammonia Impact Assessment (Document Ref: DK21007-7) for detailed methodology and results.

The Ammonia Impact Assessment Report identified the following habitats as being potentially at risk: The River Barrow and River Nore SAC, the River Nore SPA and the Lisbigney Bog SAC.

The following table shows the listed habitats potentially at risk.

Table 8.1: The habitats identified within the Natura 2000 sites potentially at risk as a result of ammonia deposition.

NATURA 2000 SITE	Habitats or Species	Critical Level (µm/m^3)	Critical Load (kg/ha/year)
River Barrow and River Nore SAC	Alluvial Forests	3.0	15.4
Lisbigney Bog SAC	Calcareous Fens	3.0	15.4

Ammonia emissions are not expected to increase as a result of the proposed development as it is not proposed to increase the numbers of pigs at the site. Thus, the volume of slurry generated at the site is expected to persist at current levels. Additionally, the proposed development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere.

The results of the report conclude that "*The impacts of the proposed pig farm in isolation are under EPA limits and therefore complies with the Step 4 evaluation criteria at all modelled locations on the Nore River SPA."*

Potential in-combination impacts via air quality are further discussed in section 10.

It has been determined that the proposed development would not have a significant impact on the Lisbigney Bog SAC or River Barrow, River Nre SAC or River Nore SPA due to a

deterioration in water quality during the construction or operational phase. Potential in-combination impacts on water quality are discussed in section 10.

9.0 MITIGATION MEASURES

This assessment has determined that the proposed development has the potential to impact upon the River Barrow and River Nore SAC and River Nore SPA due to a potential deterioration in water and air quality. As discussed in Section 7, it is considered that the proposed development has the potential to impact upon the following qualifying interests:

River Barrow and River Nore SAC:

- [3260] Floating River Vegetation
- [91E0] Alluvial Forests
- [1029] Freshwater Pearl Mussel
- [1990] Nore Freshwater Pearl Mussel
- [1092] White-clawed Crayfish
- [1095] Sea Lamprey
- [1096] Brook Lamprey
- [1099] River Lamprey
- [1106] Atlantic Salmon
- [1355] Otter

Lisbigney Bog SAC:

- [7210] *Cladium* Fen

River Nore SPA:

- [A229] Kingfisher

9.1 Operational Phase

As part of the impact assessment and design process, the potential impacts from ammonia air quality and depositional nitrogen were identified as potential risks to designated sites during the operational phase of the development.

Accordingly, mitigation measures have been incorporated into the design of the proposed new pig houses and alterations to the existing structures at the site, as proposed in this planning application. The proposed pig houses and 11 of the existing 13 houses would be constructed / converted to shallow pit storage, rather than deep pit storage, The heights and locations of fan stacks have also been altered in order to improve the dispersion of ventilated air from the operating farm.

Air impact assessment modelling has determined that the design of the proposed farm alterations and extension would not result in a significant impact to designated sites. It is not considered that further mitigation is required to reduce or prevent impacts to designated sites as a result of air quality impacts.

10.0 IN COMBINATION EFFECTS

The following plans and projects were reviewed and considered for in-combination effects with the proposed development:

- Laois County Development Plan 2021 - 2027;
- Proposed and permitted developments in the area available on Laois County Council planning system.

The proposed development is located in a rural area, with some nearby residential properties located along the local road network. The land use of the area is mainly agricultural pasture, with one-off housing and occasional farmyards. The site is located 3.1km north-east of Ballinakill town centre, 4.9km south-east of Abbeyleix town centre and 15.1km south of Portlaoise. There are few commercial enterprises within the general area, with the exception of agricultural enterprises and quarrying. The following plans and projects were reviewed and considered for in-combination effects with the development site.

Table 10.1: Recent planning applications within 1km to the development site

Application No.	Development Type	Outcome	Approximate Distance
21383	(A) construct domestic garage/shed, store and all associated site works, (B) change the site boundaries from those granted under planning reference 09544, (C) retain changed location of existing dwelling house from that position granted under planning reference 09544	Granted - Conditional	818m S
22760	Construct a dwelling house, garage, septic tank & percolation area and new site entrance and to include all associated ancillary works	Granted - Conditional	823m NW
2360402	Change of house type from that previously granted on plg file no. 22/760 and all associated site works.	Granted - Conditional	823m NW
19559	Construct new dwelling house, domestic garage, septic tank, percolation area, new site entrance and all associated site works.	Granted - Conditional	845m NW
20682	Amend previously granted planning permission 19/559 consisting of permission to reduction footprint of dwelling house, amendments to elevations and all associated site works.	Granted - Conditional	845m NW
20305	Alter elevations and plans of dwelling house granted permission under file no. 19/406 and all associated site works	Granted - Conditional	880m SE
19406	Construct a dwelling house, garage, septic tank with percolation area, entrance and all associated site works	Granted - Conditional	905m SE
20447	Extend dwelling house to include extensions to north and west sides; raise roof and provide dormer style habitable accommodation at first floor level, make alterations to elevations and all associated site works.	Granted - Conditional	930m SE

There is one EPA waste licenced facility located within 15km of the development; Enva Ireland Ltd., Waste Licence Ref. No. W0184-02, located approximately 15km to the north-

west of the site. There are also a number of EPA IE / IPC licenced facilities located within 15km of the development site, as shown in the table below.

Table 10.2: EPA Licenced Facilities within 15km of the Development

LICENCE NO.	LICENCE NAME	LICENCE TYPE (FIRST SCHEDULE OF EPA ACT, 1992, AS AMENDED)	APPROX. DISTANCE FROM DEVELOPMENT SITE
P0332-01	Randstone Ltd.	n/a	5.0km NE
P0527-01	Flemings' Fireclays Manufacturing Ltd.	13.4.1: Other Activities	8.5km E
P0531-01	Dineen Refractories Ltd.	13.4.2: Other Activities	11.1km E
P0359-03	Tirlán Ltd.	7.2.1: Food and Drink	12.0km SW
P1108-01	Leprino Foods EU Ltd.	7.8 (a) (i): Food and Drink	13.4km N
P0849-01	Michael O'Shea	6.2 (a): Intensive Agriculture	14.4km SE
P1028-01	Tirlán Ltd.	7.8 (a) (iii): Food and Drink	14.4km N
W0184-02	Enva Ireland Ltd.	11.2 (j): Waste	14.8km NW
P0322-01	Laois Sawmills Ltd	8.3: Wood, Paper, Textiles and Leather	15.0km NE

Potential in-combination effects are discussed under the following headings.

10.1 HABITAT LOSS / FRAGMENTATION

As discussed in Section 6.1, the proposed development does not directly impinge on any part of a European site, and as such would not be expected to have any *in-situ* effects upon a protected site through loss or destruction of habitat or fragmentation of habitat. With regards *ex-situ* effects, it is not considered that the proposed development site would contain the habitats or species for which the River Barrow and River Nore SAC, Lisbigney Bog SAC and River Nore SPA have been designated.

The surrounding land-use of the proposed development site is mainly agricultural pastureland, with one-off housing and occasional farmyards, which can be considered modified and of low biodiversity value.

No trees or hedgerows are to be removed as part of this development. Vegetation within the agricultural grassland is to be removed however, this is considered as having been modified and of low ecological value. Any future landscaping will incorporate a mix of native and non-native non-invasive species within its design.

While no proposed developments were identified on the Laois County Council planning site within the immediate vicinity of the applicant's proposed site, should future planning applications be submitted for the area, it is likely that they would also be located on agricultural land. Therefore, it is unlikely that future proposed developments would result in the loss or fragmentation of habitats with potential links to the designated habitats of the River Barrow or River Nore SAC, Lisbigney Bog SAC, or habitats which support the special conservation interests of River Nore SPA sites.

10.2 DISTURBANCE TO SPECIES

Disturbance to species may arise through noise emissions and human activity. The main in-combination noise and human activity effects would be from any commercial activities within the area. However, as noted above, there are few commercial enterprises located within the vicinity of the development site, with the general area around the development site mainly used for agricultural purposes and for some dispersed one-off housing. Therefore, owing to the distances of commercial activities and the EPA licenced facilities detailed in the table above, given the nature of activities at the proposed development (internal rearing of pigs), it is considered that there would be no cumulative noise impacts, or other disturbance effects due to human activity, which would pose a significant risk to designated sites or species.

Also, it should be noted that construction works are a temporary activity. Given the absence of tree removal and mitigation measures if any tree removals should be undertaken in terms of bats and birds, it is considered that there would be a neutral to no impact.

A majority of the existing trees, hedgerows are to be retained, therefore it is not anticipated that the proposed development in combination with other developments would result in a significant impact to protected species. Any future developments would be subject to individual assessment and follow principles within the Laois County Development Plan 2021-2027 to prevent disturbance to fauna.

10.3 AIR QUALITY

It is not expected significant cumulative impacts of the proposed development with regards to air emissions. The nearest EPA licensed facility which is currently in operation and has the potential to generate cumulative air impacts with Tulleka Trading ULC is the manufacturer of ceramic products Flemings' Fireclays Manufacturing Ltd (P0527-01) located c. 8.5 km east from the proposed development.

In addition, the nearest EPA licenced intensive agricultural installation to the Moate Pig Unit farm site (P0849-01) which could act in combination to generate cumulative impacts with the proposed development (i.e. ammonia emissions) is located approximately 14.4km.

An Ammonia Impact Assessment was carried out in the context of the existing baseline ammonia and nitrogen deposition conditions at Natura sites, which comprise of the existing farm and emissions from other similar activities in the area. Therefore, the in-combination effects of the proposed development have been included as part of the assessment.

Table 10.3: Predicted Annual average max Ground level NH_3 concentration for Proposed Pig Production Facility ($\mu g/m^3$) was measured for the following Natura 2000 sites:

NATURA 2000 SITE	Predicted Annual average max Ground level NH_3 conc. for Existing Pig Production Facility ($\mu g/m^3$)	Nitrogen deposition flux (kg ha^{-1} yr^{-1})	Nitrogen deposition critical load (kg ha^{-1} yr^{-1})
River Barrow and River Nore SAC	0.05	0.5	30.0
Lisbigney Bog SAC	0.03	0.3	15.0
Max predicted value	**0.005**	**0.5**	**30.0**
Critical level	**3.0**	**-**	**-**

As can be seen in the table above, the process contributions (PC) from the existing farm fall below the 20% threshold level defined in Step 5 EPA's Ammonia and Nitrogen Assessment Guidance at all ecologically sensitive receptor locations modelled on the River Barrow and Nore SAC and on the Lisbigney Bog SAC. There will be no increase in animal stocking numbers as per the proposed development. Therefore, it is not anticipated an increase in ammonia and nitrogen emissions arising from activities carried out at the farm that could impact ecologically sensitive locations upon completion of the development.

At 20% of the nitrogen deposition critical load, the process contribution limits for each site would be 6 or 3 kg ha^{-1} yr^{-1}. The nitrogen deposition process contributions (PC) for the proposed farm extension would comply with these limits at each site.

Commented [LS2]: See Tables 10 and 11 from Ammonia IA.

Barrow & Nore SAC:
30kg/ha/yr (Critical load) * 20% (threshold) = 6kg/ha/yr (PC Limit) > 0.5kg/ha/yr (Worst Case PC)

Lisbigney Bog SAC:
15kg/ha/yr (Critical load) * 20% (threshold) = 3kg/ha/yr (PC Limit) > 0.3kg/ha/yr (Worst Case PC)

There would be no change in the volume of slurry generated at the site. Additionally, the proposed development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere. The development would include the conversion from deep storage to shallow storage, which has been noted as a recommended design feature within the document, "*Reference Document on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs*", for reducing air emissions.

The results of Step 1 of EPA's Ammonia and Nitrogen Assessment Guidance indicates background levels of ammonia exceed the relevant critical level for ammonia at some locations at nearby Natura 2000 sites, which required the completion of a Step 4 assessment. Results from Step 4 were below the evaluation criteria for River Nore SPA but above for River Barrow and River Nore SAC and Lisbigney Bog SAC. Accordingly, a Step 5 Assessment was carried out for discrete receptors at the two sites.

The Step 5 assessed the worst-case cumulative impacts on ecologically sensitive receptors on Natura 2000 sites within the zone of influence of the development due to the pig farm in combination with other intensive agricultural installations (IAI). Results of the assessment indicated that the worst-case cumulative impact of the pig farm with other IAIs (1.7% of the critical level for ammonia) was well below the in-combination evaluation criteria defined at all modelled locations (20% threshold level). Therefore, the proposed pig farm complies with the EPA evaluation criteria at all sensitive locations, namely the River Barrow and River

Nore SAC, Lisbigney Bog SAC and River Nore SPA. See accompanying Katestone's Ammonia Impact Assessment Report (Document Ref: DK21007-7).

The report has concluded that:

- *The impacts of the proposed pig farm in isolation are under EPA limits and therefore complies with the Step 4 evaluation criteria at all modelled locations on the Nore River SPA.*
- *The cumulative impacts of the proposed pig farm with background IAIs are under EPA limits and therefore complies with the Step 5 evaluation criteria at all modelled locations on River Barrow and River Nore SAC and Lisbigney Bog SAC.*

There would be no significant additional impact to the River Barrow and River Nore SAC, Lisbigney Bog SAC or the River Nore SPA as a result of Nitrogen Deposition from the farm.

10.4 DETERIORATION IN WATER QUALITY

Continued implementation of the Water Framework Directive would result in achieving, or maintaining, improvements to water quality in the Nore Catchment. Developments such as this proposed development could act in combination with existing environmental pressures on the Nore Catchment, including: agriculture, anthropogenic, domestic and urban waste water, urban run-off, industry (including extractive) and forestry. In particular, the proposed development could act in combination with other similar projects which are hydrologically connected with the Owveg River or River Nore.

As discussed in Section 6.3, the proposed development would not be considered to have an impact upon the listed habitats and species of River Barrow and River Nore SAC or River Nore SPA sites due to deleterious effects on water quality owing to the location of the development site, the nature of the development, the duration of construction works, the proposed drainage system, the considerable hydrological distance between the proposed development and the designated sites, and given that the proposed development is not located within the immediate vicinity of any watercourses.

It is not considered that the proposed development would have impact either on its own or in combination with other developments with regards to the land spreading of manure / sludges. As discussed in Section 6.3, pig manure from the development site is currently land spread, and would continue to be land spread, on third party lands in the area. The land spreading of manure is undertaken in accordance with the Nitrates Regulations, such as complying with the timing of the land spreading, nutrient management planning and set-back distances around sensitive receptors and transport vectors. Additionally, the proposed development does not include an increase in animal stocking numbers at the farm and no alteration to current manure generation at the site is anticipated. Therefore, no cumulative impacts upon water quality due to land spreading would be anticipated.

It is therefore considered that there would be no significant cumulative impacts upon water quality which could pose a risk to River Barrow and River Nore SAC or River Nore SPA.

11.0 CONCLUSION

It is not anticipated that the proposed development, subject to recommended mitigation measures, by itself or in combination with other developments, would impact negatively upon the Natura 2000 network during the site preparation or operational phases of the project.

The proposed development site is located approximately 276m from the River Barrow and River Nore SAC (Site Code: 002162) and would be hydrologically connected to this site and to the River Nore SPA (Site Code: 004233). It is considered that the proposed development would not result in any significant risk to the protected habitats and species of the aforementioned sites due to habitat fragmentation or loss, disturbance or reduction in species density or introduction of invasive species.

It is considered that there would be no potential risk of significant impacts upon the qualifying interests of these protected sites due to the proposed mitigation measures to be employed.

It is the conclusion of this Natura Impact Statement that, subject to recommended mitigation measures, there would be no potential for significant impacts on European sites as a result of the proposed development and mitigation measures to be employed. This conclusion refers to the development by itself or in combination with other developments.

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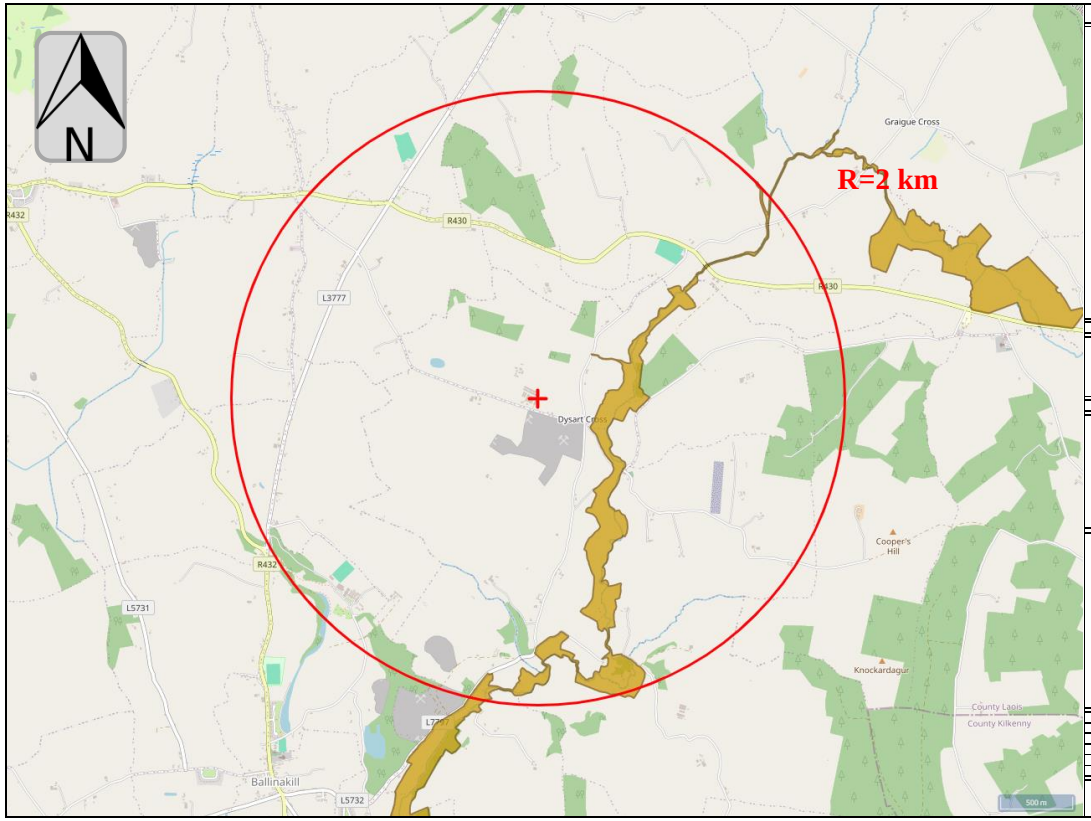
APPENDIX A

PROTECTED SITES AND PROPOSED DEVELOPMENT LOCATION



Notes

Site Location –

S.P.A. –

S.A.C. –

Project Title:

PROTECTED SITES
MAP - 2KM

Client Name:

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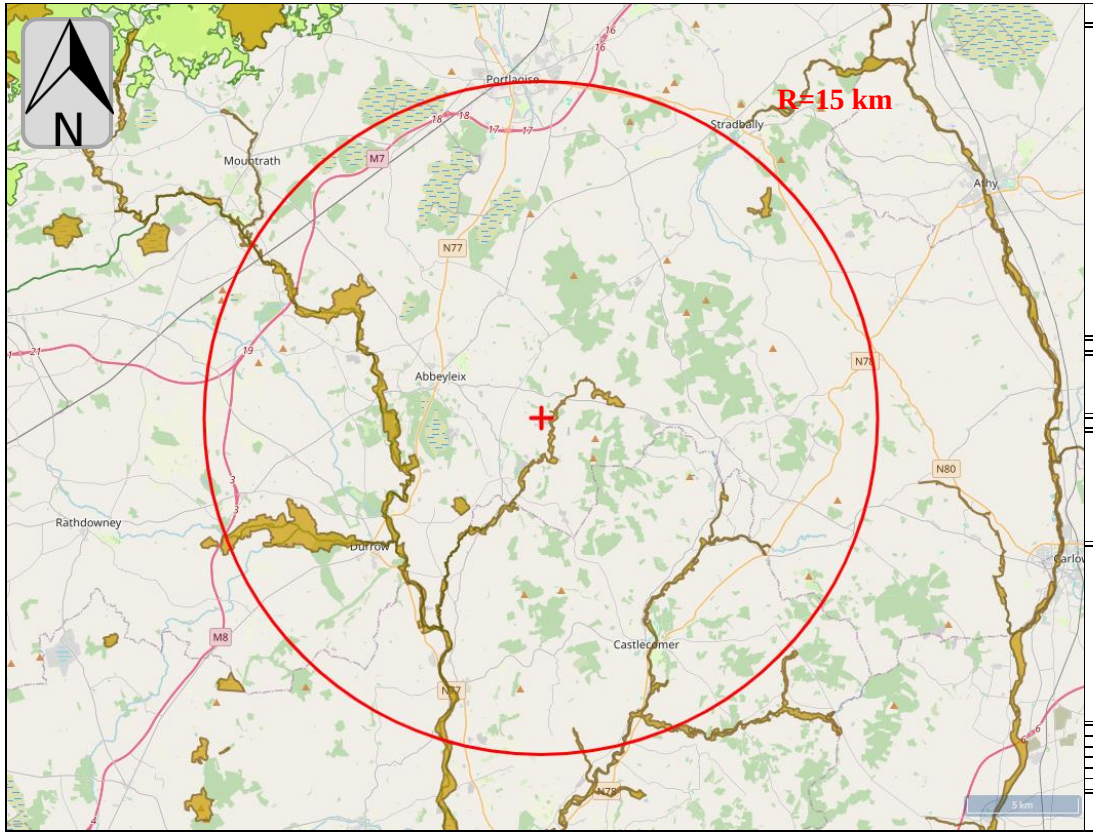
UNITS 3 & 4
INNOVATION CENTRE
GREEN ROAD
CARLOW
R93 W248

TELE: 059 91 34222
MOBILE: 087 851 9284
EMAIL: info@pantherwms.com
WEB: www.pantherwms.com

Drawing Status:	**Scale:**	NTS	A4
Report	**Datum:**		EPA Envision
Drawing Number: PES_NIS_10049	**Drawn:**		NR
	Checked:		MF
Revision:	**Approved:**		-
R1	**Date:**		26/01/2024



Notes

Site Location –

S.P.A. –

S.A.C. –

Project Title:

PROTECTED SITES
MAP - 15KM

Client Name:

**TULLEKA TRADING ULC.,
GRAIGUE,
CO. LAOIS**

PANTHER
ECOLOGY LTD

UNITS 3 & 4
INNOVATION CENTRE
GREEN ROAD
CARLOW
R93 W248

TELE: 059 91 34222
MOBILE: 087 851 9284
EMAIL: info@pantherwms.com
WEB: www.pantherwms.com

Drawing Status:	**Scale:** NTS	A4
Report	**Datum:**	EPA Envision
Drawing Number: PES_NIS_10049	**Drawn:**	NR
	Checked:	MF
Revision:	**Approved:**	-
R1	**Date:**	26/01/2024

APPENDIX B

PHOTO LOG

Plate 1: Existing site entrance

Plate 2: Buildings and artificial surfaces (BL3)

Plate 3: Improved agricultural grassland (GA1)

Plate 4: Recolonising bare ground (ED3) habitat

Notes:

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**APPENDIX B
PHOTO LOG**

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CARLOW, IRELAND
R93 W248

TELEPHONE: 059 91 34222
MOBILE: 087 851 9284
EMAIL: info@pantherwms.com
WEB: www.pantherwms.com

file location:		scale: N/A	A4
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drawing no.	rev	checked:	MF
NIS_10049	A	approved:	-
		date:	03/11/2023

Plate 5: Scattered trees and parkland (WD5)

Plate 6: Section of hedgerows (WL1) to the south

Plate 7: Amenity grassland (GA2)

Plate 8: Proposed construction area

Notes:

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APPENDIX B
PHOTO LOG

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MOBILE: 087 851 9284
EMAIL: info@pantherwms.com
WEB: www.pantherwms.com

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